DELAWARE LAKE OHIO

MASTER PLAN UPDATE

PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

August 2011 Draft

US Army Corps of Engineers

Huntington District
Huntington, West Virginia

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List of Acronyms

AMSL	Above Mean Sea Level
BMP	Best Management Practice
BLM	Bureau of Land Management
cfu	colony forming units
DM	Design Memorandum
EO	Executive Order
ERGO	Environmental Review Guide for Operations
HPMP	Historic Properties Management Plan
ml	milliliters
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory

OH	Ohio
ODH	Ohio Department of Health
ODNR	Ohio Department of Natural Resources
OEPA	Ohio Environmental Protection Agency
OMP	Operational Management Plan
PEA	Programmatic Environmental Assessment
PL	Public Law
RUO	Resource Use Objective
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service

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1.0 INTRODUCTION

1.1 Scope of the Programmatic Environmental Assessment

The United States Army Corps of Engineers (USACE) periodically updates master plans for its projects to support each site's authorized purposes. The previous Master Plan Update for Delaware Lake, prepared in September 1985, has been updated in 2011 to include recommendations for improvements to support the authorized purposes of flood risk management, recreation, and low flow augmentation. This Programmatic Environmental Assessment (PEA) is intended to provide a broad evaluation of the potential environmental consequences of the program of improvements proposed by the USACE (the Proposed Action), as well as the consequences of not proceeding with this program (the No Action Alternative). The PEA has been prepared in coordination with federal and State of Ohio (OH) resource agencies to satisfy the requirements of the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] §§ 4321- 4327) and other applicable regulatory requirements. The PEA will also assist USACE decision-makers in implementing the recommended measures identified in the 2011 Master Plan Update. In the future, after design details and specifications are developed for specific actions authorized by provisions of an Operational Management Plan (OMP), Design Memoranda (DM), or other planning procedures, additional supplementary environmental documentation will be prepared as needed. Depending on the nature of expected impacts resulting from individual or a combination of improvements, this documentation may take the form of measure-specific environmental assessments or categorical exclusions, as determined necessary for compliance with federal and state laws and regulations.

1.2 Project Background

Delaware Lake (hereafter referred to as the Project) is located in Delaware, Marion, and Morrow Counties, Ohio, on the Olentangy River which is a tributary to the Scioto River in central Ohio. The majority of the project lies within Delaware County. The Project is located 28 miles north of Columbus, OH and three miles north of the City of Delaware, OH. Figure 1-1 shows the location of the Project as well as major highways in the Project area. The Project consists of 7,703 acres owned by the USACE and either managed by the USACE or leased or licensed and managed by another entity (with USACE oversight) as an outgrant. An outgrant is a written interest granted to an individual, organization, or agency allowing use of government property. The instrument conveying the interest typically contains conditions and restrictions on the use of the property. The managing entities of an outgrant must comply with all applicable restrictions and requirements of the Master Plan Update and USACE regulations. The primary recreation

and outgrant areas, acreages, existing amenities, and managing entities are listed in Table 1-1 and shown in Figure 1-2. The USACE currently oversees 7,703 acres in fee and an additional 2,428 acres of flowage easements at the Project.

Table 1-1: Federal Recreation Areas and Outgrant Areas

Name of Area	Acreage	Managing Agency	Major Facilities/Activities
Dam Site Recreation Area	25	USACE	Picnicking, hiking, sightseeing, fishing
Delaware State Park and Wildlife Area	7,409	Ohio Department of Natural Resources (ODNR)	Picnicking, boating, swimming, disc golf, camping, hiking, fishing, hunting, Marina, shooting range

The original Delaware Lake Master Plan was approved in December 1946 as DM 1. The Master Plan was subsequently updated in September 1985 as DM 1-A. (U. S. Army Corps of Engineers, 1985). This PEA addresses the broad program-level impacts of the 2011 Master Plan Update to the previous 1985 Master Plan Update. The 2011 Master Plan Update is presented in Appendix A of this PEA.

1.3 Project Authorization

The Delaware Lake Project was authorized for construction by the Flood Control Act of 1938, Public Law (PL) 75-761, which was passed by the 75th Congress on June 28, 1938. Public Law 78-534, passed during the 78th Congress on December 22, 1944 authorized recreation as one of the project purposes.

1.4 Project Purpose and Need

The purpose of the 2011 Master Plan Update is to provide guidance for the preservation, conservation, restoration, maintenance, management, and development of Project lands, waters, and associated resources. The Master Plan Update is intended to aid responsible stewardship of Project resources for the benefit of present and future generations.

The Master Plan Update evaluates the present use and future potential of Project resources and recommends strategies for the future management and development of Project resources. Because the Master Plan Update is conceptual in nature, it identifies conceptual types and levels of activities, not designs and exact locations.

The Master Plan Update is based on responses to regional and local needs, resource capabilities and suitability, and expressed public interests that are consistent with authorized Project purposes and pertinent legislation and regulations. The Master Plan Update provides a USACE District-level policy consistent with national objectives and other State and regional goals and programs. Future actions by the USACE and by the agencies and individuals granted leases or licenses for use of Project lands must be consistent with the Master Plan Update. The Master Plan Update is distinct from the project-level implementation emphasis of the OMP. Policies in the Master Plan Update are guidelines that will be implemented through provisions of the OMP, specific design memoranda, and other planning mechanisms.

The broad intent of the Master Plan Update is to:

- Determine appropriate uses and levels of development for Project resources;
- Provide a framework within which the OMP and other planning mechanisms can be developed and implemented; and
- Establish a basis on which outgrants and recreational development proposals can be evaluated.

The purpose of this PEA is to evaluate, on a broad level, the impacts of the recommended resource plan measures proposed in the 2011 Delaware Lake Master Plan Update. Master plans are periodically updated to maintain focus on three primary components: regional and ecosystem needs, resource capabilities and sustainability, and public interests and desires. An updated Master Plan is essential in fostering efficient and cost-effective projects for natural resources, cultural resource management, and recreational programs by ensuring that current environmental mandates and considerations are taken into account as part of project planning (U.S. Army Corps of Engineers, 1996a). Additionally, the Master Plan Update describes recommendations (e.g., boat ramp improvements, picnic shelters, and informational signage) to accommodate increased or new demands that may affect project resources in the future.

The 2011 Master Plan Update addresses the resources and issues in the Project area, consisting of, but not limited to: fish, wildlife, vegetation, cultural, aesthetic, interpretive, recreational, mineral, commercial, outgrant lands, easements, and water. Through the implementation of an updated Master Plan, the USACE can provide responsible and timely protection, conservation, and enhancement of Project resources. The PEA is needed to assist the USACE in their decision-making process regarding implementation of the Master Plan Update measures and to comply with NEPA and other applicable laws and regulations.

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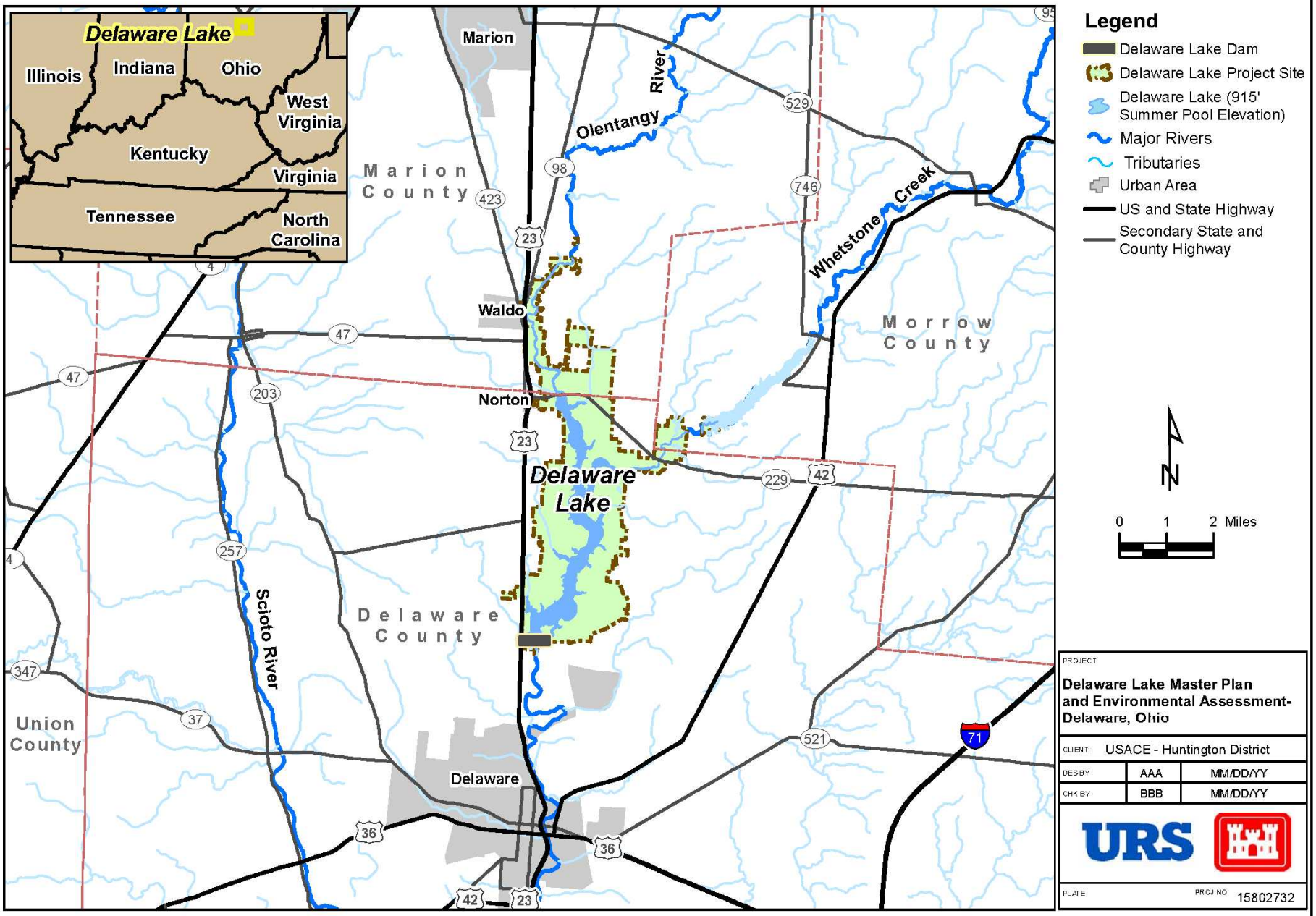

Figure 1-1: Location of the Delaware Lake Project

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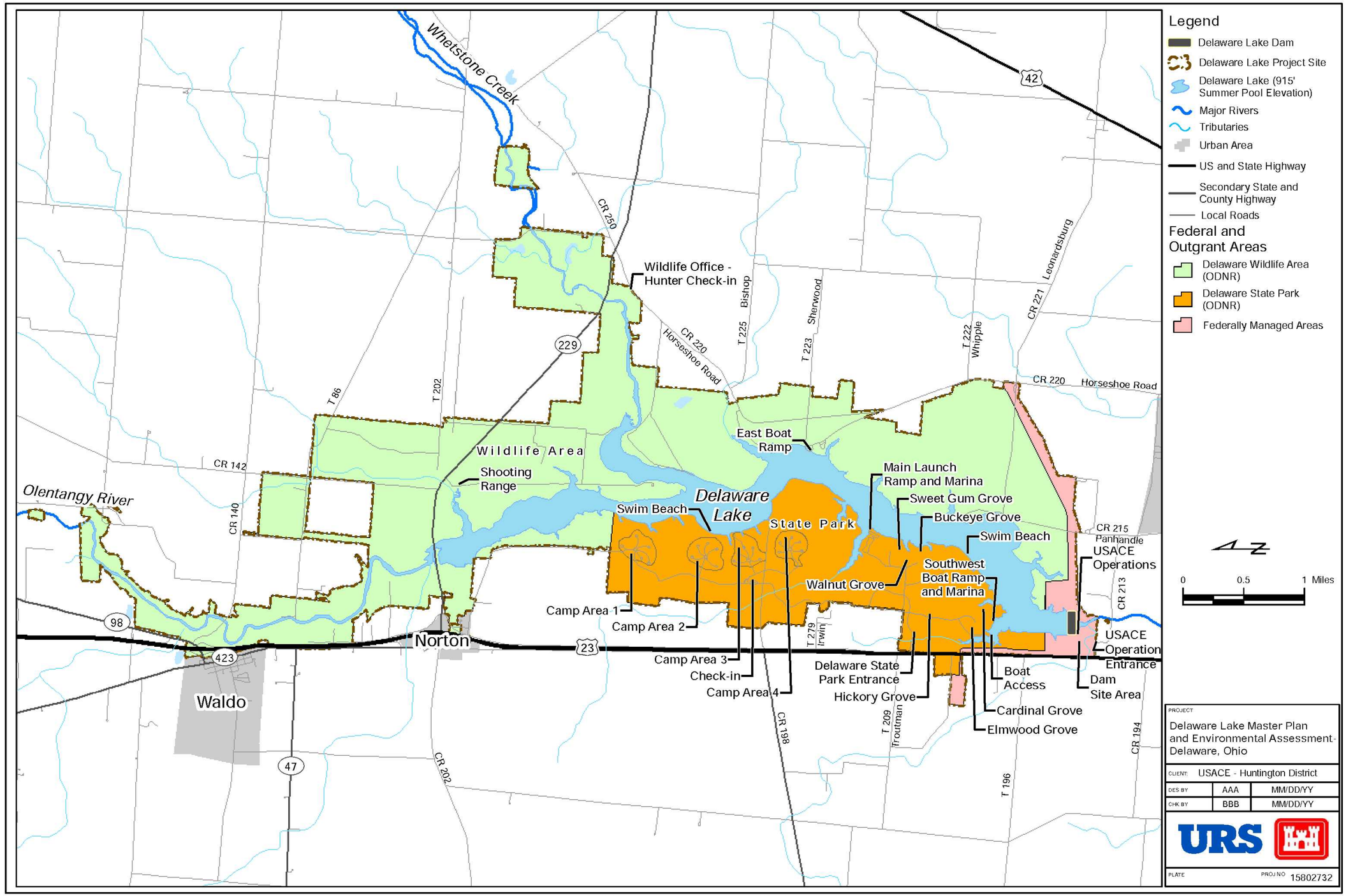

Figure 1-2: Recreational Areas and Outgrants in the Delaware Lake Project

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2.0 NO ACTION AND PROPOSED ACTION ALTERNATIVES

2.1 No Action Alternative

Under the No Action Alternative, no new actions outlined in the 2011 Master Plan Update would be undertaken. Operation and management of Delaware Lake would continue as described in the 1985 Master Plan Update. Existing facility maintenance, wildlife and vegetation enhancement, erosion control, flood risk management, and management of recreation areas and activities would continue. In addition, new facilities and/or activities not identified in the 1985 Master Plan Update may be constructed or implemented on a case-by-case basis.

2.2 Proposed Action

The Proposed Action consists of the measures and actions that are listed in Table 2-1. The Proposed Action would address the projected demands that are identified in the Master Plan Update. More information about the elements of the Proposed Action is provided in Section 7.0 of the Project Master Plan Update, included as Appendix A to this PEA. Full implementation of the Master Plan Update would allow updated management and development of the Project lands and waters, thus reflecting environmental stewardship and conservation best management practices while meeting current and future public, social, and economic demands.

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Table 2-1: Resource Plan for the Delaware Lake Project

Project Area	Land Classification	Management Agency	Issue	Recommendations
Dam Site Area	Project Operations	USACE	With the increase in popularity of the Dam Site Area, existing parking facilities are inadequate to accommodate the demand. Additionally, since parking is limited near the tailwater area, fishermen use the existing parking lots that are allocated for the day use picnic areas. (RUO 3)[1]	• Construct an additional parking area for the Dam Site Area. • Develop a road and parking lot to the tailwater area.
			The below dam recreation area and associated trail system is well utilized, however about 15 acres is not accessible because there is no creek crossing. (RUO 3) [1]	• Expand the existing trail resulting in a one mile continuous trail system. • Construct a pedestrian bridge over the creek as part of the trail.
			There are no interpretive features or wildlife observation areas at the Dam Site Area and sightseeing and nature/wildlife observation were identified in the Ohio SCORP as high participation activities with increasing participation rates. (RUO 3) [1]	• Provide interpretive signs and nature/wildlife observation areas along the trail.
			There is no universally accessible access to the below dam fishing area. (RUO 1) [1]	• Develop a universally accessible fishing pier in the tailwater area with universal accessibility from the parking area.
			The potable water supply system servicing the Dam Site Area is in poor condition and is not reliable. (RUO 3) [1]	• Improve potable water service to the Dam Site Area. Evaluate alternatives including tapping into the existing 6 inch water line along US 23.
Delaware Lake State Park Picnic/Day Use Area	Recreation (Intensive Use)	ODNR	Some of the picnic/day use areas have relatively low utilization, including Walnut Grove, Cardinal Grove, Elmwood Grove, and Hickory Grove. The Buckeye Grove Picnic Area and associated group picnic shelter have a high utilization rate. The group shelter is consistently reserved on weekends during the recreational season. The Sweet Gum Picnic Area has relatively high use associated with the disc golf course. (RUO 3) [1]	• Construct new group shelters at Walnut Grove, Hickory Grove, and Elmwood Grove. • Add other amenities/recreational activities such as playgrounds, multi-purpose game courts, and disc golf at picnic areas.
			Restroom facilities are old and outdated at picnic areas. (RUO 3) [1]	• New restroom facilities should be considered at all picnic/day use areas.
Delaware Lake State Park Beach/Day Use Area	Recreation (Intensive Use)	ODNR	The restroom facilities at the public beach are outdated and are frequently inundated and damaged during flood events. One of the old bathhouse facilities at the beach has been removed because of vandalism and maintenance issues. (RUO 3) [1]	• Construct an elevated universally accessible facility at the beach to accommodate restrooms, showers, a vending machine concession area, and a pavilion. Elevating the structure would mitigate against frequent flooding and associated damage.
			The demand for parking is less than the available parking; consequently, approximately 50 percent of the parking lot is closed. (RUO 3) [1]	• Maintain parking area currently open and used. As demand increases as projected in the recreation program analysis, refurbish and incrementally reopen the closed parking areas as needed.
Delaware State Park Marina and Boat Ramps	Recreation (Intensive Use)	ODNR	There is substantial congestion at the marina and boat ramp during the peak weekends, holidays, and fishing tournaments. Also, the ramps are outdated relative to current boat usage and size; this effectively reduces launch capacity. Turn-a-round areas are inefficient for boat prep prior to launch and securing boats after retrieval. This adds to congestion at the boat ramps by blocking circulation and blocking access to parking areas. The parking lot is often at capacity during the recreation season. The larger vessels using the lake require longer truck/trailer combinations for which current truck/trailer parking spaces are not adequate. (RUO 1) [1]	• Plans are currently in place to improve the boat ramp area and associated parking area.
			The camp store, restroom facilities, and fuel storage facility are old and in need of rehabilitation and/or replacement. (RUO 1) [1]	• Renovate or replace the camp store, restroom facilities, and the fuel storage facility.

Table 2-1: Resource Plan for the Delaware Lake Project

Project Area	Land Classification	Management Agency	Issue	Recommendations
Delaware State Park Southwest Marina	Recreation (Intensive Use)	ODNR	The recreation demand analysis indicates a need for 5-7 boat ramp lanes. The current two lane boat ramp at Southwest Marina is outdated relative to current boat usage and size, which reduces boat launch efficiency. Turn-a-round areas are inefficient for boat prep prior to launch and securing boats after retrieval. This adds to congestion at the boat ramps by blocking circulation and blocking access to parking areas. There is only one courtesy dock. (RUO 1) [1]	• Improve boat ramp to more efficiently accommodate current boat usage and size. • Provide improved striping and markings to delineate the boat ramp lanes, pre-launch areas, and areas for securing boats after retrieval, as well as procedural signage to increase user awareness and efficiency. • Improve turn-a-round area near the boat ramp to more efficiently accommodate boat prep prior to launch and securing boats after retrieval. • Add courtesy docks to improve boat launch efficiency.
			Boat slips at the Southwest Marina are 16' long and inconsistent with current boat usage and size. (RUO 1) [1]	• Reconstruct marina and boat slips to accommodate longer and wider boats consistent with current boat usage and size. However, due to current medium to high density boating activity on the lake during recreational season weekends, any recommendation for additional boat slips should be supported by a detailed Lake Carrying Capacity analysis to verify that marina expansion will not result in boating activity that exceeds the carrying capacity of the lake.
			Currently there is no restroom facility at the west segment of the marina. (RUO 1)	• Add a new restroom facility near the west segment of the marina.
			Some of the boat trailer parking lots are remote, resulting in inefficient access to the boat ramp. (RUO 1)	• Develop more direct access paths from remote boat trailer parking to the boat ramp.
Delaware State Park Campground	Recreation (Intensive Use)	ODNR	Water and sewer utilities are old and in poor condition (circa 1960) and associated facilities, such as restroom/bathhouses are outdated. Demographics within the area of influence also indicate an aging population who desire upgraded RV camping facilities and amenities. (RUO 2) [1]	• Rehabilitate or replace existing water and sewer utilities and associated bathhouses. In the process, consider providing sewer and water connections at RV campsites. • Provide wireless internet service throughout the campground. Wireless internet is an amenity that has been growing in popularity and would be used by a wide variety of visitors.
			The campsites are typically reserved on weekends throughout the recreation season and are at or near capacity. Yurts/cabins are also in high demand. The recreation program analysis indicates a greater than 12 percent increase in camping visits. (RUO 2) [1]	• Develop additional RV campsites and cabins to support current and future demand. • Alternatives for campground expansion include areas north of Camp Area 1 and south of • Camp Area 4.
Delaware Wildlife Area	Multiple Resource Management - Wildlife Management	ODNR	The Sherwood boat ramp and parking area is in poor condition. The ramp lane widths are obsolete relative to current boat usage and size. The courtesy dock is small and in poor condition. The larger vessels using the lake require longer truck/trailer combinations for which current truck/trailer parking spaces are not adequate. (RUO 1) [1]	• Plans are currently underway to improve this boat ramp and develop an efficient one lane boat ramp with improved parking.
			Access roads within the Wildlife Area are in poor condition and can limit accessibility. (RUO5)	• Improve access roads for fishing, hunting, and wildlife observation.
			The Wildlife Area supports diverse habitats including wetlands, native grasslands, and bottomland hardwoods. These diverse habitats support target game species as well as non-target species. There is currently no interpretive areas or signage for these unique ecosystems. (RUO 3 and RUO 4) [1]	• Continue to manage the Wildlife Area to support diverse habitat for target game species and develop interpretive areas within the unique habitats.
			The rifle, handgun, and shotgun range has high utilization and the parking lot does not have enough capacity to meet demand during peak periods. There are site constraints which limit the ability to increase parking. The area is also low and subject to inundation. (RUO 5)[1]	• Relocate shooting range. • Relocate parking lot and increase the number of parking spaces.
			The seasonally flooded wetland areas are popular for hunting waterfowl, but there is limited habitat to support waterfowl hunting. (RUO5) [1]	• Enhance or expand seasonally flooded wetlands to increase waterfowl habitat.
Lake	Not Applicable	USACE and ODNR	Boat swimming/overnight boat stays are increasing in popularity in the region. (RUO 1,2 3,&4) [1]	• Designate additional coves for boater's swim areas / overnight boat stays to meet future demand.
			Sedimentation occurs at a relatively rapid rate at the lake affecting marina maintenance and potential boating operations relative to navigable depths. (RUO 1) [1]	• Conduct regular surveys to document levels of sedimentation and water depths. • Consider design of a system to reduce sedimentation and maintenance dredging at the marina. • Develop management plan for dredged material with identified beneficial use of dredged material such as development of sledding hills for winter activities across from the Sweet Gum Picnic Area.
			Significant growth in paddle sport activities is forecast and there is a public desire for improved access for paddle sports. (RUO1) [1]	• Develop a paddle sport area in the idle speed areas of the lake.
Project Wide	Not Applicable	Multiple Agencies	Invasive species are present on site and may potentially threaten existing natural ecosystems. (RUO 4) [1]	• Implement an invasive species plan to prevent the introduction of invasive species and control and monitor invasive species already present at the Project area in a cost effective and environmentally sound manner.
			The Project includes unique habitats such as wetlands, native grasslands, and habitats that support neo-tropical migratory birds and bottomland hardwoods. (RUO 4) [1]	• Conduct baseline study that identifies unique habitats throughout the Project (e.g., wetland, native grasslands, and bottomland hardwoods) and develop a monitoring program. Knowing the amount and range of the habitats would allow losses or gains to be tracked.

[1]RUO Refers to the Resource Use Objective, which is defined in Chapter 5 of the 2011 Master Plan Update (Appendix A)

3.0 ENVIRONMENTAL SETTING

3.1 Physical Environment

3.1.1 Topography

The Delaware Lake Project is located in the Till Plains Section of the Central Lowlands Province of the Scioto River Basin. The topography of Delaware Lake is characterized by level plains transitioning to gently rolling terrain with glacial drift mantling the bedrock and filling the preglacial valleys (Ohio Department of Natural Resources, 2005b). Elevations in the Project range from approximately 880 feet National Geodetic Vertical Datum (NGVD) directly below the dam to 950 feet NGVD on the higher slopes at the northern end of the Project area. This compares to the topography of Ohio in general, which ranges from 430-1,550 feet. Steep slopes greater than 30 percent are limited to sections of the shoreline of the lake associated with coves, as well as the northern portions of the Project area along the Olentangy River and Whetstone Creek. As shown in Figure 3-1, the vast majority (approximately 90 percent) of the Project area consists of slopes less than 15 percent.

3.1.2 Geology and Mineral Resources

Delaware County and the portions of Morrow and Marion Counties within the Project area are underlain by sedimentary rocks such as limestone, shale, and sandstone. The oldest exposed rocks are from the Silurian age, created about 400 million years ago. The youngest rocks are about 350 million years old. Continental glaciers that spread over much of the Project area during the Pleistocene transported huge loads of debris consisting of boulders, cobbles, pebbles, sand, silt, and clay that were deposited as the ice melted. These deposits are generally called glacial drift. Materials in the drift were derived from the bedrock and soils over which the glaciers passed. There are three primary surficial deposits found in the Project area, consisting of till, ground moraines, and lacustrine deposits. Till is a particular type of drift made of a compact and heterogeneous mass of unsorted sand, silt, clay, pebbles, and cobbles and a few boulders. Ground moraines are a till-mantled land surface that is relatively smooth and has little topographic relief. Most of Delaware County consists of ground moraines. Silts and clays that settled out of glacial melt water are classified as lacustrine deposits and these only occur in a few low stream terraces.

There is no record of any extraction of sand and gravel deposits along the Olentangy River in the Project vicinity. Surveys have indicated that there are no coal deposits on or near the Project.

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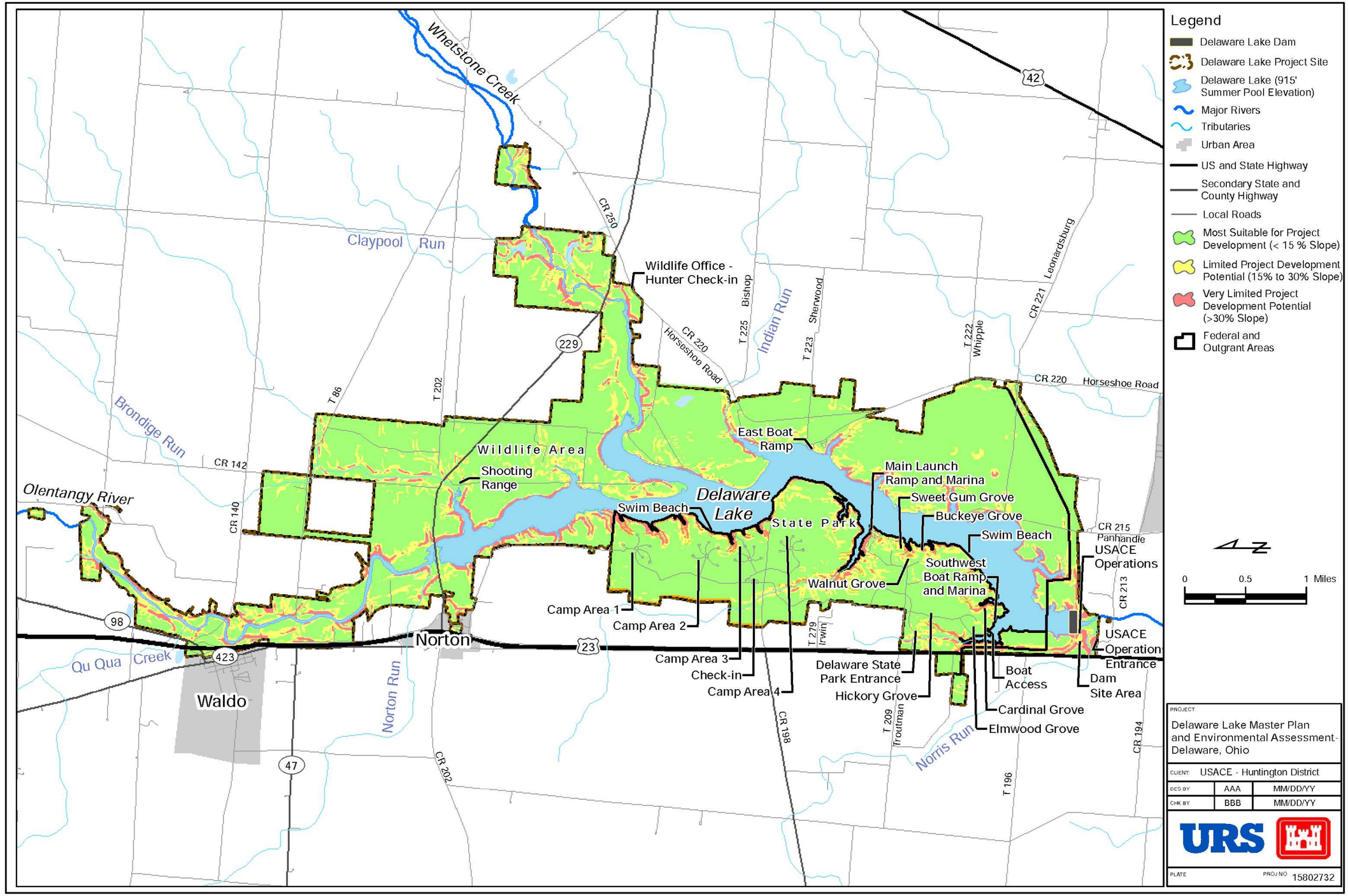

Figure 3-1: Topography Suitability for Project Development

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A review of oil and natural gas wells at the Project recorded at least one abandoned and/or plugged well within the Project boundary. However, there are no active oil or natural gas wells currently operating within the Project boundary. Figure 3-2 shows the locations of both active and abandoned oil and natural gas wells located in the Project vicinity. The federal government owns all mineral rights within the Project boundary. Any leasing of mineral rights and mineral extraction would be under the control, and follow procedures of, the Bureau of Land Management (BLM). The BLM would coordinate any new leases with the USACE to avoid or minimize impacts to recreational, natural, or sensitive resources associated with access road and extraction site development.

3.1.3 Soils

Twenty-one different groupings of soils occur at the Project (U.S. Department of Agriculture, Natural Resources Conservation Service, 1989, 1993, and 2006). These soil groupings are listed in Table 3-1, along with the suitability and limitations of these soil types and slopes for recreational development. Figure 3-3 categorizes the soil types identified in Table 3-1 into three groups: 1) most suitable for project development; 2) limited project development potential; and 3) least suitable for project development. Based on the information in Table 3-1, the Fox, Gallman, Glynwood, Kendallville, Martinsville, Medway, Morley, Nolin, Ockley, Pacer, Rossburg, Sleeth, Tioga, and Whitaker soils provide the best opportunity for development because they are the only units classified as "most suitable" or "limited development potential." These soil units occur in broad areas adjacent to the Olentangy River, along coves where Whetstone Creek enters the lake, and between the ravines associated with small creeks that flow into Delaware Lake. Soils that are classified by the U.S. Department of Agriculture (USDA) as prime or unique agricultural soils include Gallman, Martinsville, Ockley, Pacer, Rossburg, and Sleeth soil types, and are located along the Olentangy River and the lake.

Table 3-1: Soils in Order of Predominance in the Project Area

Symbol	Soil Type	Typical Slopes (%)	Suitability based on slope and soil type
GwB, GnB2, GnC2, GwC2, GwD2	Glynwood silt loam	2-18%	**Limited Project Development Potential**. Unsuitable (too wet) for lawn or landscaping; for camping, picnicking, or playground areas; for small buildings; or for septic tank absorption field. Somewhat suitable for trails and golf fairways. Poorly suited for roads due to low strength and frost action.
BoA, BoB, BpA	Blount	0-6%	**Least Suitable for Project Development**. Unsuitable (too wet) for lawn or landscaping; for trails or golf fairways; for camping, picnicking, or playground areas; for small buildings; or for septic tank absorption field. Poorly suited for roads due to low strength, wetness, and frost action.
PwA, Pm, Pk	Pewamo	0-1%	**Least Suitable for Project Development.** Unsuitable (due to ponding) for lawn or landscaping; for trails or golf fairways; for camping, picnicking, or playground areas; for small buildings; or for septic tank absorption field. Poorly suited for roads due to low strength, ponding, and frost action.
PaA	Pacer silt loam	0-2%	**Most Suitable for Project Development.** Suitable for lawn or landscaping; for trails or golf fairways; for camping, picnicking, or playground areas; for small buildings; or for septic tank absorption field. Somewhat suitable for camping, picnicking, and golf fairways. Poorly suited for roads due to shrink-swell and frost action.
SgA, Sh	Shoals silt loam	0-2%	**Least Suitable for Project Development**. Unsuitable (due to wetness) for lawn or landscaping; for trails or golf fairways; for camping, picnicking, or playground areas; for small buildings; or for septic tank absorption field. Poorly suited for roads due to low strength, wetness, and flooding.
LyD2, LyE2	Lybrand silt loam	12-18%	**Least Suitable for Project Development.** Unsuitable (too steep) for lawn or landscaping; for trails or golf fairways; for camping, picnicking, or playground areas; for small buildings; or for septic tank absorption field. Poorly suited for roads due to low strength, slope, and frost action.
GaB, GaC2, GbA, GbB, GcB	Gallman	0-12%	**Limited Project Development Potential**. Suitable for lawn or landscaping; for trails or golf fairways; for camping or picnicking; for small buildings; or for septic tank absorption field. Very limited for playground development. Suitable for roads, although there is moderate slope and frost action.
No	Nolin silt loam	0-3%	**Limited Project Development Potential**. Somewhat suitable (due to flooding) for lawn or landscaping or for picnicking, playground area, and trails. Unsuitable for camping; for small buildings; or for septic tank absorption field. Poorly suited for roads due to frost action, flooding, and low strength.
SnA, So, SoA, Sp	Sloan silt loam	0-2%	**Least Suitable for Project Development**. Unsuitable (due to ponding) for lawn or landscaping; for trails or golf fairways; for camping, picnicking, or playground areas; for small buildings; or for septic tank absorption field. Poorly suited for roads due to ponding, flooding, and frost action.

Table 3-1: Soils in Order of Predominance in the Project Area

Symbol	Soil Type	Typical Slopes (%)	Suitability based on slope and soil type
KeB, KeD2	Kendallville loam	2-18%	**Most Suitable for Project Development.** Suitable for lawn or landscaping; for trails or golf fairways; or for camping, picnicking, or playground areas. Somewhat suitable for small buildings or for septic tank absorption field. Poorly suited for roads due to slope, shrink-swell, and frost action.
MfA, MgA, MhA	Millgrove	0-2%	**Least Suitable for Project Development**. Unsuitable (due to ponding) for lawn or landscaping; for trails or golf fairways; for camping, picnicking, or playground areas; for small buildings; or for septic tank absorption field. Poorly suited for roads due to ponding and frost action.
OcA, OcB	Ockley	2-6%	**Most Suitable for Project Development**. Suitable for lawn or landscaping; for trails or golf fairways; for camping, picnicking, or playground areas; for small buildings; or for septic tank absorption field. Somewhat suitable for golf fairways. Somewhat suitable for roads due to shrink-swell and low strength.
FoB	Fox loam	2-6%	**Most Suitable for Project Development.** Suitable for lawn or landscaping; for trails or golf fairways; or for camping, picnicking, or playground areas. Somewhat suitable for small buildings or for septic tank absorption field. Somewhat suitable for roads due to shrink-swell and frost action.
Me	Medway clay loam, rarely flooded	0-2%	**Limited Project Development Potential.** Unsuitable (due to flooding) for camping; septic tank absorption fields; or for small buildings. Somewhat suitable for playground areas or picnicking; for trails; or for golf fairways. Poorly suited for roads due to frost action.
RoA, RsA	Rossburg silt loam	0-2%	**Limited Project Development Potential**. Unsuitable (due to flooding) for camping; for small buildings; or for septic tank absorption fields. Somewhat suitable for lawn or landscaping; for trails or golf fairways; or for picnicking or playground area. Poorly suited for roads due to flooding.
LsA	Lobdell	0-2%	**Least Suitable for Project Development.** Unsuitable (too wet) for lawn or landscaping; for trails or golf fairways; for camping, picnicking, or playground areas; for small buildings; or for septic tank absorption field. Unsuitable for roads due to flooding and frost action.
MoC2, MoD2	Morley silt loam	6-18%	**Limited Project Development Potential.** Unsuitable (too steep) for lawn or landscaping; for trails; for playground areas; for small buildings; or for septic tank absorption field. Somewhat suitable for camping, picnicking, or golf fairways. Poorly suited for roads due to low strength and slope.
WhA	Whitaker loam	0-3%	**Limited Project Development Potential**. Somewhat suitable for lawn or landscaping; for trails or golf fairways; for picnicking and playground area; for camping; for small buildings; or for septic tank absorption field. Poorly suited for roads due to shrink-swell and frost action.

Table 3-1: Soils in Order of Predominance in the Project Area

Symbol	Soil Type	Typical Slopes (%)	Suitability based on slope and soil type
Tg	Tioga	0-2%	**Limited Project Development Potential**. Unsuitable (due to flooding and erosion) for lawn or landscaping; for trails; for camping; for small buildings; or for septic tank absorption field. Somewhat suitable for picnic areas, playgrounds, or golf fairways. Poorly suited for roads due to flooding.
SkA	Sleeth silt loam	0-3%	**Limited Project Development Potential**. Unsuitable (due to wetness) for lawn or landscaping; for camping; for small buildings; or for septic tank absorption field. Somewhat suitable for picnic areas, trails, or golf fairways. Poorly suited for roads due to low strength and frost action.
MbB	Martinsville loam	2-6%	**Most Suitable for Project Development.** Suitable for lawn or landscaping; for trails or golf fairways; for camping, picnicking, or playground areas; for small buildings; or for septic tank absorption field. Moderately suited for roads due to shrink-swell, low strength, and frost action.

Source: USDA, NRCS, 1989, 1993, and 2006

3.1.4 Land Use/Land Cover

Land uses within the Project are shown in Figure 3-4. Over 60 percent of the Project area is forested (NatureServe, 2007). Land cover in the Project area includes forest, grasslands, herbaceous vegetation, and open water (Figure 3-5). Table 3-2 identifies land cover types and acreages within the Project site. Variations in topography and soil type also contribute to the diverse forest ecosystems in central Ohio.

Table 3-2: Land Cover in the Delaware Lake Project

Land Cover	Percent of Project Area
North-Central Interior Dry-Mesic Oak Forest and Woodland	25%
Open Water	18%
North-Central Interior Beech-Maple Forest	17%
North-Central Interior Floodplain	12%
Agriculture - Cultivated Crops and Irrigated Agriculture	10%
Appalachian (Hemlock)-Northern Hardwood Forest	6%
Pasture/Hay	4%
Developed Open Space	3%
Other (developed) includes low, medium and high intensity developed land	1%
Other (natural) includes herbaceous, successional shrub/scrub, and interior small stream/riparian categories	4%

Source: NatureServe, 2007

3.1.5 Water Resources and Quality

3.1.5.1 Surface Water Resources and Quality

As described previously, the approximately 7,700-acre Project is located in Delaware, Marion, and Morrow Counties in Ohio on the Olentangy River, which is a tributary of the Scioto River. The Olentangy River, formed from five main tributaries, flows generally southward for approximately 90 miles and drains into the Scioto River in Columbus, OH. The Project area is approximately 32 miles upstream from the confluence of the Olentangy River and the Scioto River (Figure 3-6). The five main tributaries are Norton Run, Qu Qua Creek, Brondige Run, Whetstone Creek, and Indian Run. Norton Run is located on the northwest side of Delaware Lake and empties into the Olentangy at the very north end of the main body of the lake (Figure 3-7). Two other unnamed streams flow into the west side of the lake. Qu Qua Creek is located north of the Project area. An unnamed stream and Qu Qua Creek flow southward, emptying into the Olentangy River at the northern end of the Project area and forming the western fork of the "Y" shaped lake. Brondige Run and two unnamed streams join on the Project property and empty into the northeast part of the lake. On the east central side of the lake, Whetstone Creek collects water from Claypool Run and five unnamed streams and empties into a large cove that forms the eastern fork of the "Y" shape of the lake. Indian Run also empties into the central part of the lake south of the Whetstone Cove on the eastern side of the lake.

The Delaware Dam is the only USACE dam on the Olentangy River, providing flood risk management and controlling the downstream flow to maintain a sufficient water supply. The dam is located at river mile 32.3 in Delaware County. Delaware Lake receives runoff from a 385 square mile drainage basin. The entire Olentangy River basin drains approximately 536 square miles and generally flows south. The Delaware Lake watershed and the Olentangy River watershed represent only a small portion of the total Scioto River Basin regional watershed, which drains approximately 3,196 square miles of land (Figure 3-6). The drainage areas of the Olentangy River and its principal tributaries are presented in Table 3-3.

Table 3-3: Drainage Areas of the Olentangy River and Principal Tributaries

Stream	Location	River Mile	Area (square miles)
Olentangy River	At mouth		536
Olentangy River	Near Delaware, Ohio		393
Olentangy River	**At dam site**	**32.3**	**386**
Olentangy River	At Clarion, Ohio	52.3	157
Whetstone Creek	At mouth		114
Grave Creek	At mouth		28.5
Flat Run	At mouth		41

Delaware Lake is formed by the dam, the topographical features of the surrounding area, and the tributaries, creeks, and streams that discharge into the Olentangy River above the dam and within the Project boundary. The surface of Delaware Lake measures approximately 1,270 acres and is approximately nine miles long with a shoreline of approximately 35 miles during the normal summer pool elevation of 915 feet NGVD. The lake also has one shorter arm on the east side of the project that extends 1.7 miles up Whetstone Creek. The lake is relatively narrow and "Y" shaped as mentioned above, with several large coves at junctions with tributaries. Water depths in the lake vary from 3-25 feet with an average depth of 12 feet. Due to the large watershed compared to the size of the lake, Delaware Lake experiences substantial fluctuations in water level. These large fluctuations also lead to a substantial amount of debris, including sediment, vegetation, and tree material, being left behind after water levels recede.

The tailwater area is located immediately downstream of the dam where the outflow from the lake is discharged. Water is released from the lake through an intake structure and passes through a tunnel to emerge as outflow. This system allows withdrawal from various water depths and offers a considerable range of choices for outflow rates and other water parameters, including temperature. A minimum flow can be maintained in times of drought in order to enhance water quality in the downstream reach of the Olentangy River.

Agriculture and land development within the Project area and surrounding land have the potential for varied effects on the water quality of streams within the Olentangy watershed. Sedimentation is problematic throughout the watershed, particularly within the Delaware Lake watershed. High erosion and destabilized stream banks commonly release excess sediment, causing turbid water and silt deposits that can harm aquatic life and have adverse impacts on recreation.

The Ohio Environmental Protection Agency (OEPA) uses two broad designations for water quality criteria when evaluating waterways: aquatic life and non-aquatic life uses. Non-aquatic life uses include recreation, human health, and water supply. The OEPA utilizes biological, chemical, and physical criteria to create measurable properties that can be compared to goals specified by each designation. According to the 303(d) List of Prioritized Impaired Waters, prepared by the OEPA for the U.S. Environmental Protection Agency (USEPA), the Olentangy River and Whetstone Creek are both impaired within the Project area. Both streams are impaired for aquatic life use, recreation use, and for human health through consumption of fish from these waters.

Water quality conditions in Delaware Lake are monitored under the Bathing Beach Monitoring Program of the Ohio Department of Health (ODH). The ODNR collects bi-weekly lake water samples on behalf of ODH at one location that are transmitted to the ODH for analysis for E. coli bacteria levels. If levels are determined to exceed state standards, a second sample may be taken and analyzed to confirm the exceedance. If sampling indicates that bacteria levels present a potential health risk to persons coming into contact with the water, including for recreational purposes such as swimming, the ODH director recommends to the ODNR Division of Parks and Recreation that signs advising the public against swimming due to the bacteriological conditions should be posted. These signs are advisory only and do not mandate beach or lake closures.

Sampling is normally performed during the bathing season extending from approximately Memorial Day to Labor Day. Sampling at Delaware Lake has been conducted on three occasions in 2011. On May 24th, results indicated a bacterial level of 156.5 colony forming units (cfu) per 100 milliliters (ml) of lake water. On June 7th, the bacterial level had dropped to 8.6 cfu/100 ml. Finally, on June 23rd, the bacterial level was determined to be 13.4 cfu/100 ml. Advisories are posted when the number of colony forming units per 100 ml of water exceeds 235. Based on the sampling data for 2011, it can be seen that bacterial levels have met state standards on all sampling occasions. Consequently, it can be concluded that water quality conditions in Delaware Lake generally support recreational activities that involve contact with lake waters. No water quality parameters that affect the taking or consumption of fish from the lake are monitored by any governmental agencies.

3.1.5.2 Groundwater Resources and Quality

Delaware County, as well as the adjoining portions of Morrow and Marion Counties, has a varying supply of groundwater with poor to excellent quality depending upon location. The semi-impervious nature of glacial till does not provide a high yield of groundwater, although buried sand and gravel layers may provide excellent yields. Water-bearing rock aquifers may underlie the till, or other water bearing surficial deposits may be located in associated landforms. Water wells in the project area and surrounding counties usually yield five gallons per minute or less (Schmidt, 1979). This is largely due to heavy clays that overlay the impermeable shale bedrock. Water under the shale is generally not tapped because it may be high in sulfur, hydrogen, sulfide, and iron (Ohio Department of Natural Resources, 2005a). There are two groundwater wells apparently located within the Project area, as shown in Figure 3-8. One groundwater well is located near the USACE Operations Headquarters and the other is located by the Wildlife Office/Hunter Check-in building. At this point it time, it is not known if these groundwater wells are still in existence and whether they supply water for these two buildings.

3.1.6 Floodplains and Flooding

One of the primary authorized purposes of the Project is flood risk management. The Project area around the lake is designed to store floodwaters to reduce flood risk downstream. Consequently, inundation by flooding is largely artificially controlled. Figure 3-9 shows inundation areas between the summer pool elevation of 915 feet NGVD and the maximum flood control pool elevation of 947 feet NGVD. Based on the information presented in Figure 3-9, the majority of the Project, particularly the areas immediately surrounding the lake, could experience inundation due to flooding. Summer flooding of the land above the recreational summer pool elevation of 915 feet NGVD is possible and does occur at times, but the majority of flooding instances occur during the winter and spring months.

Table 3-4 presents the impacts of various lake elevations on the recreation areas within the Project boundary. As indicated in the table, impacts become apparent two feet above the summer pool elevation of 915 feet NGVD. As mentioned above, the lake reaches its flood control pool at elevation 947 feet NGVD.

Table 3-4: Project Impacts Based on Lake Elevation

Elevation (feet NGVD)	Project Impacts
905 (below)	Marina loses 228 slips
908 (below)	Elmwood Ramp and Marina Ramp closed
910	Winter Pool Elevation
910 (below)	Beach closed
913 (below)	Marina loses 40 slips, submerged hazards to boaters
915	Summer Pool Elevation
917 (above)	Beach closed and shooting range closed
919 (above)	Elmwood Ramp and Marina Ramp closed
920 (above)	Begin removal of public boats from south end of docks
924 (above)	Gearheiser Road impassable
929 (above)	Begin removal of access ramps at marina docks
930 (above)	Horseshoe Road impassable
932 (above)	Pumping begins at Waldo Tomahawk Pumping Station
933 (above)	Pumping begins at Waldo South Draw Pumping Station
934 (above)	US 229 completely covered
936 (above)	Park closed, all areas evacuated

Source: USACE Water Control, 2004a

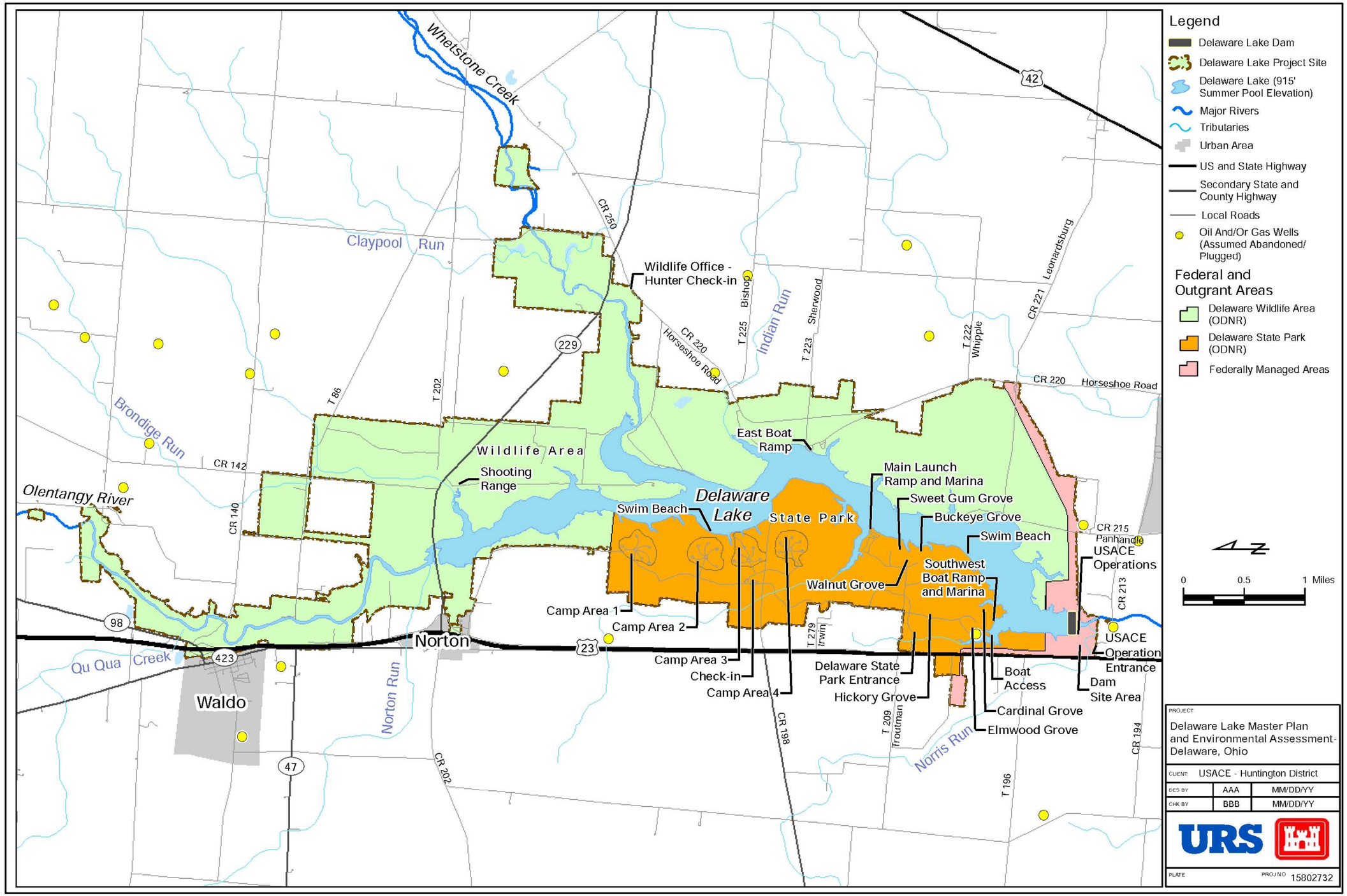

Figure 3-2: Oil and Gas Well Locations

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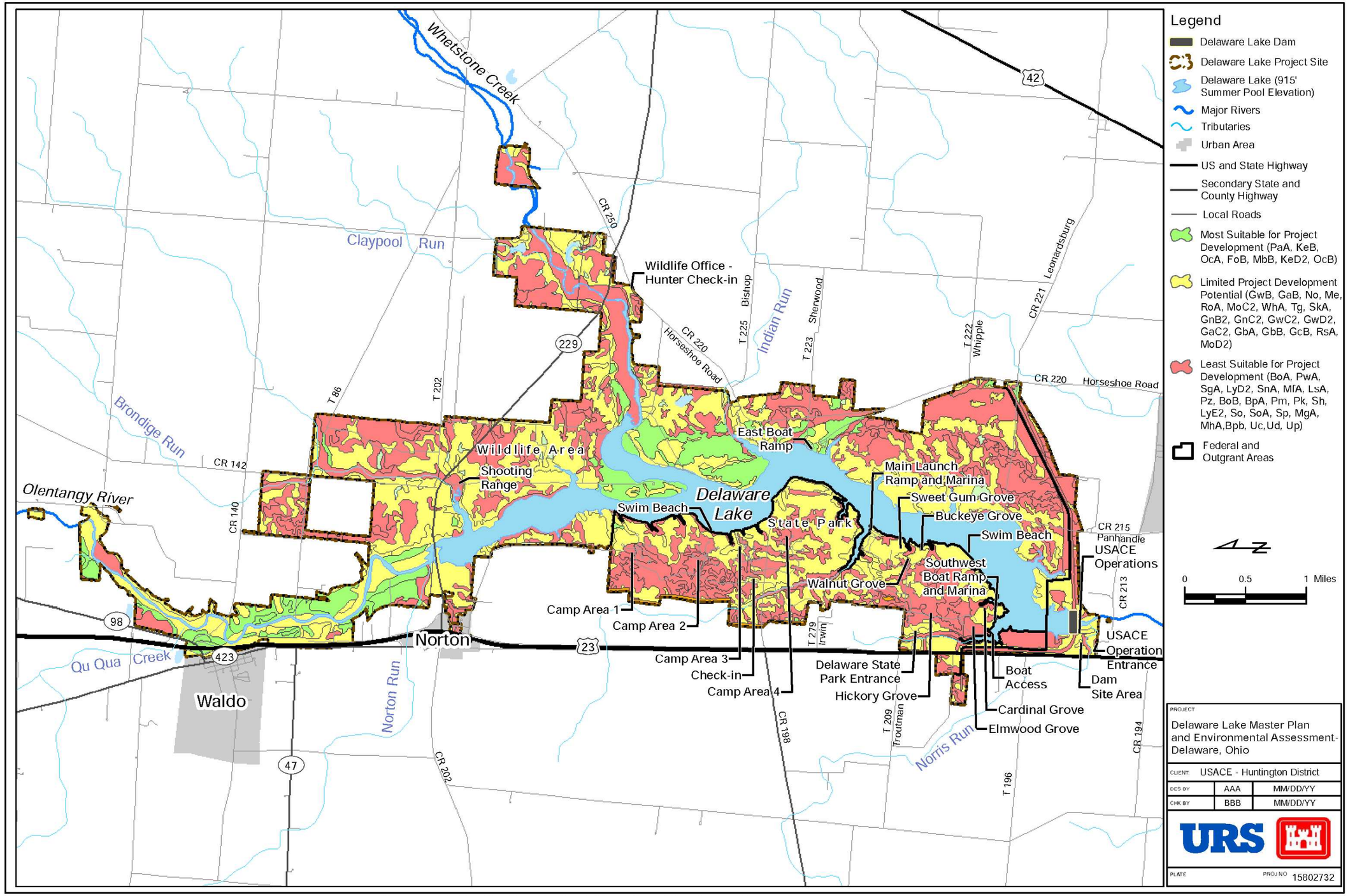

Figure 3-3: Soils Suitability for Project Development

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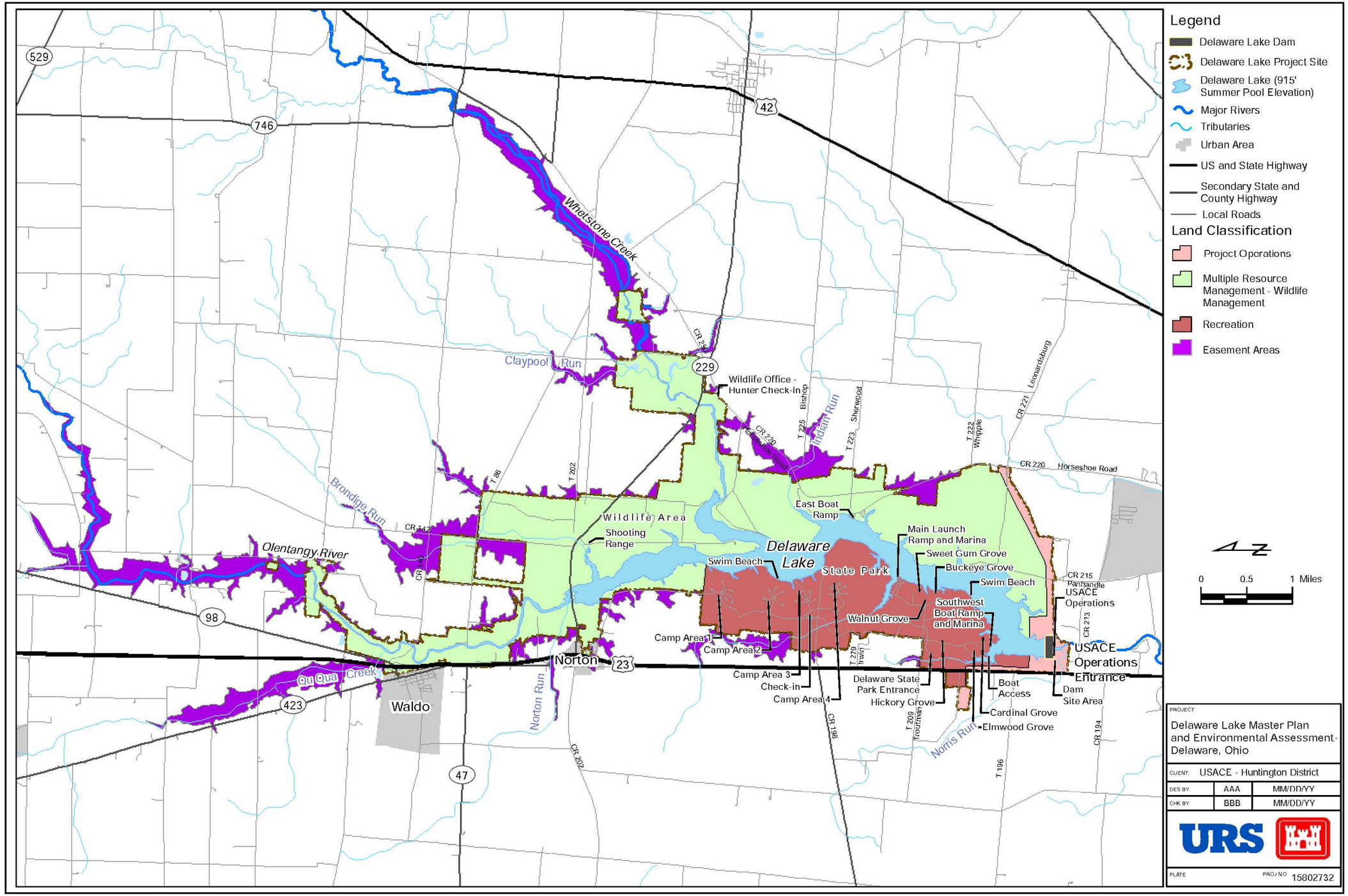

Figure 3-4: Land Classification Map

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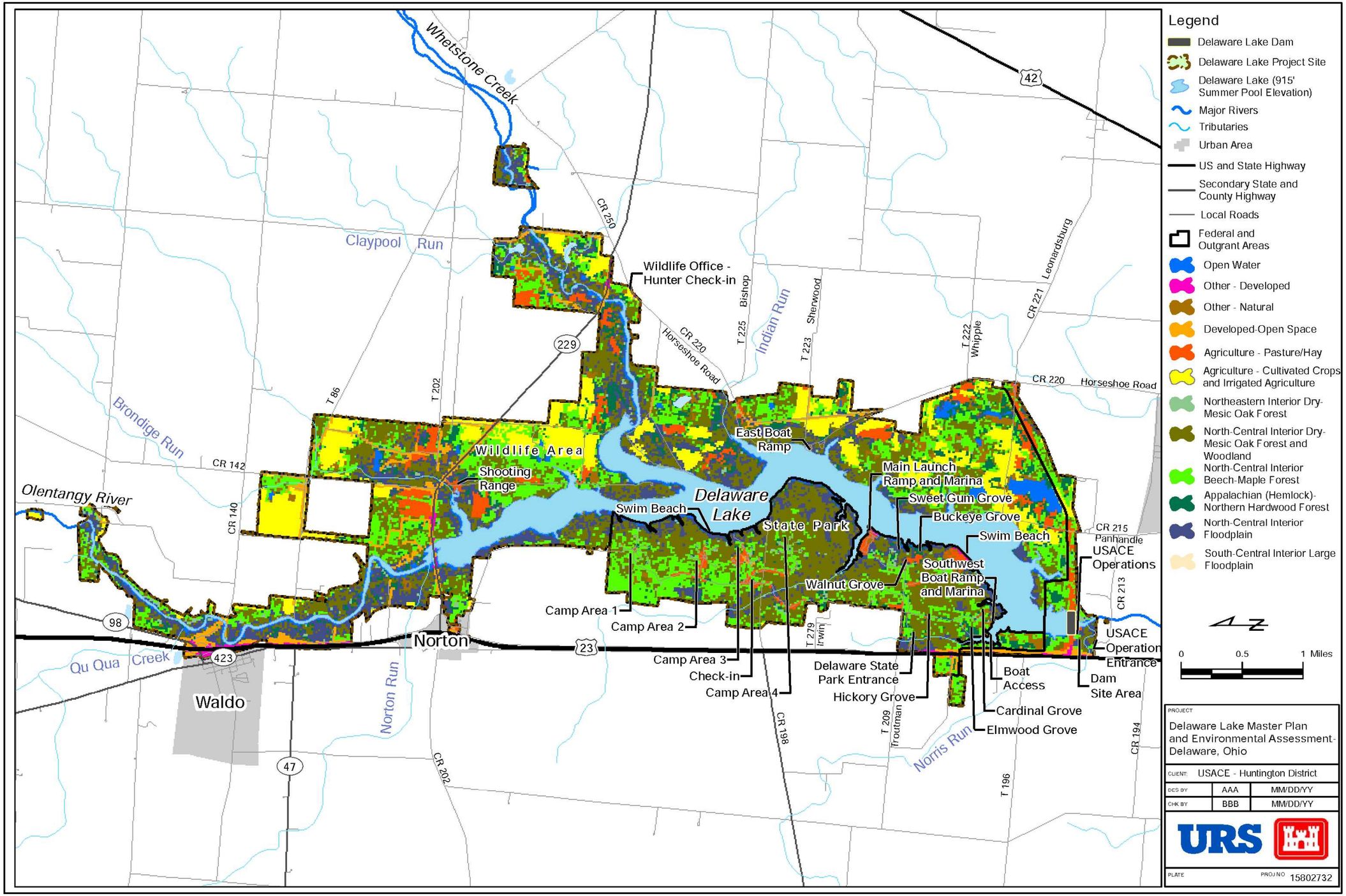

Figure 3-5: Vegetation and Land Cover

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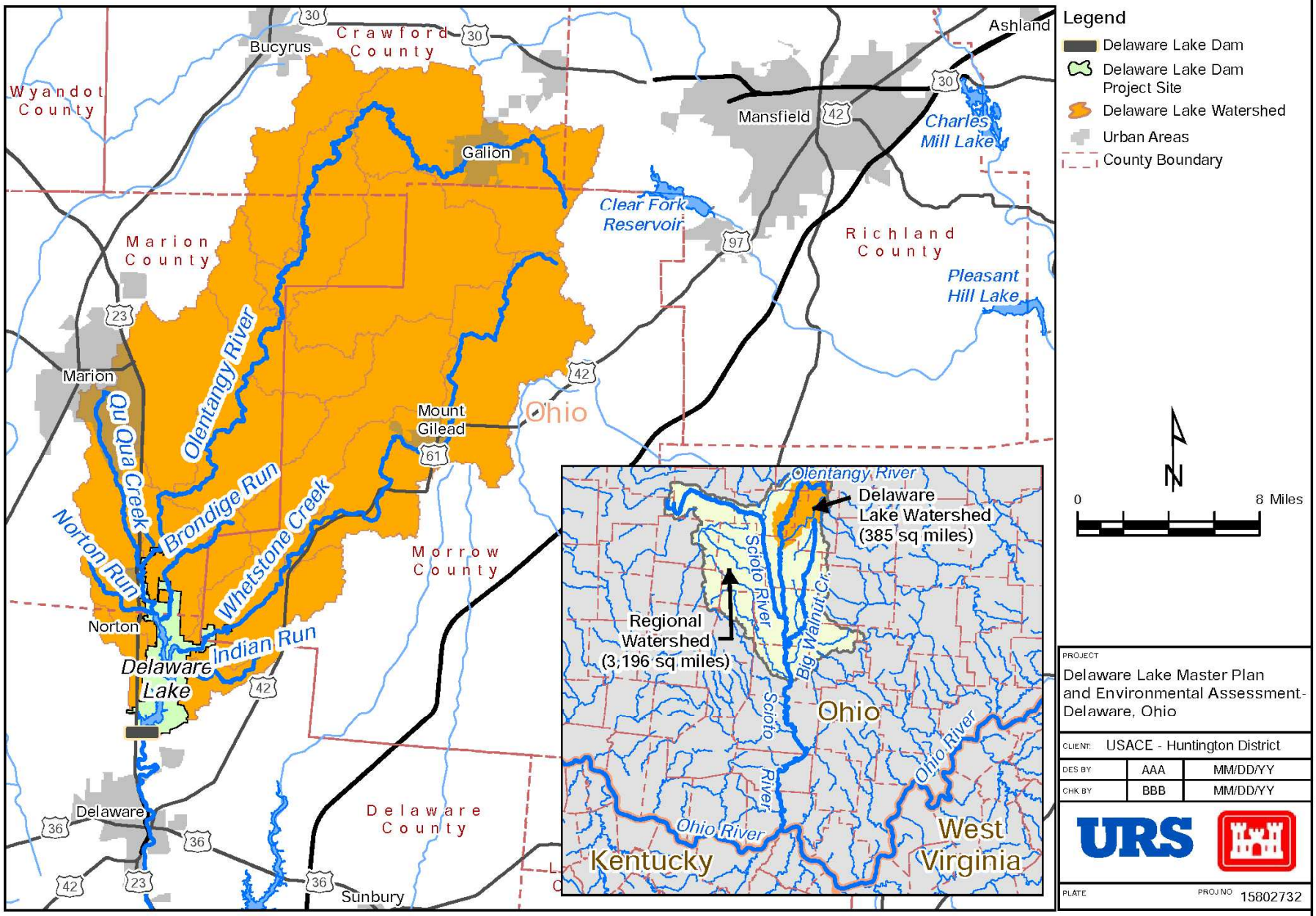

Figure 3-6: Delaware Lake Project Watershed

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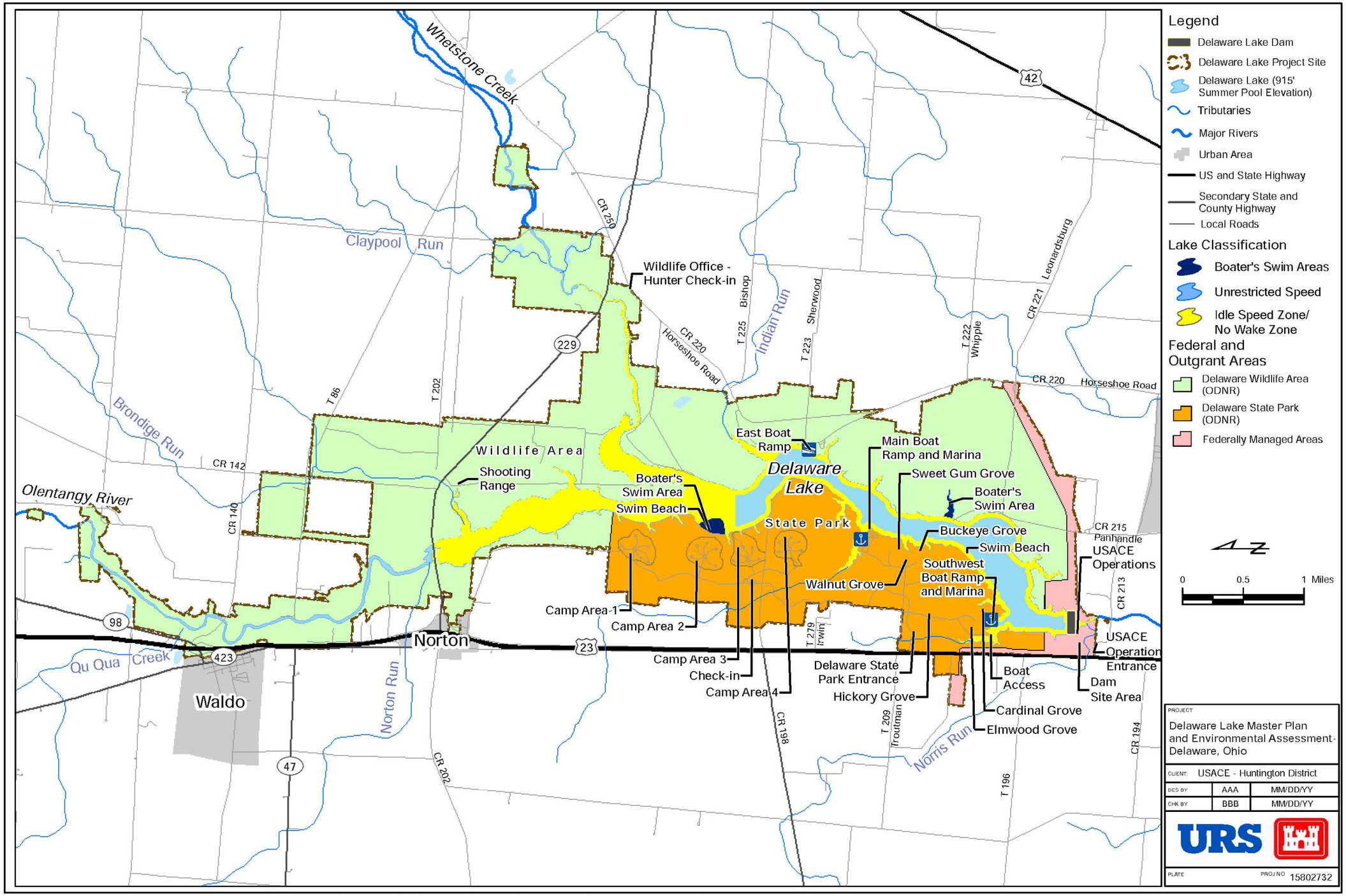

Figure 3-7: Surface Waters Within the Delaware Lake Project

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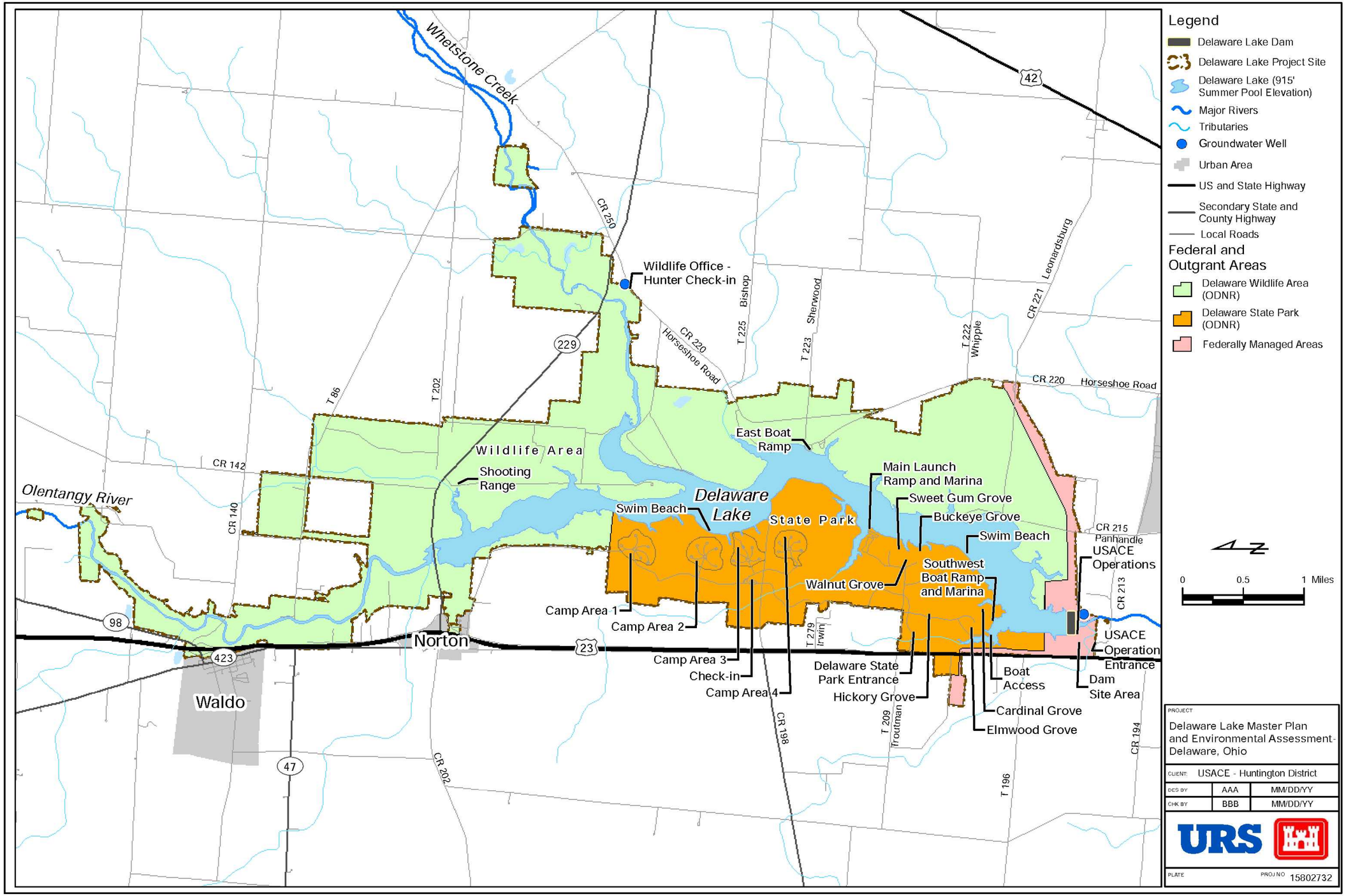

Figure 3-8: Groundwater Well Locations

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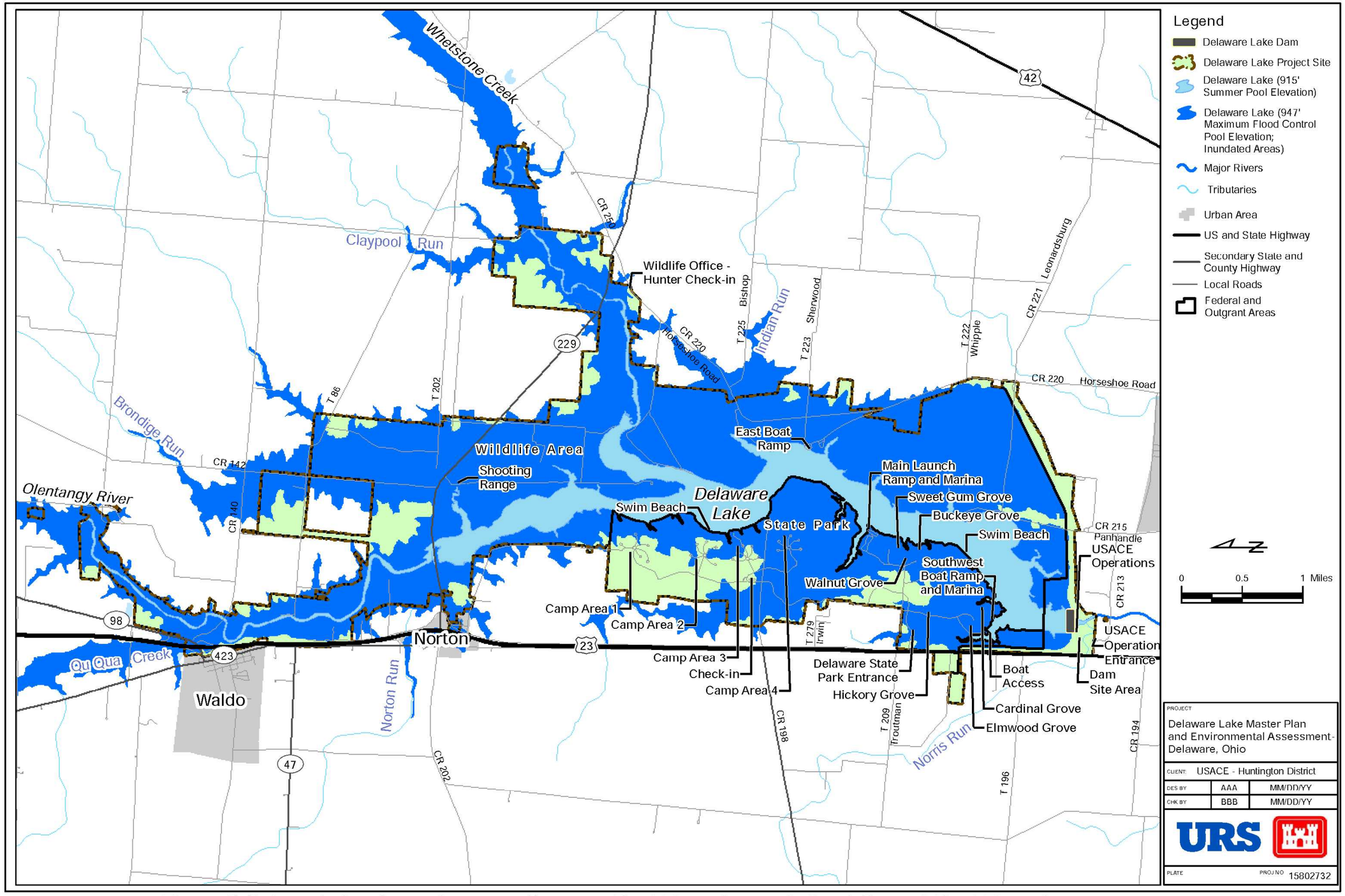

Figure 3-9: Inundation Areas between Summer Pool Elevation and Flood Control Pool Elevation

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3.1.7 Air Quality

The USEPA has set National Ambient Air Quality Standards (NAAQS) for six principal air pollutants (also referred to as criteria pollutants): carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter (separate standards for particulate matter with a diameter less than 2.5 microns and for particulate matter with a diameter between 2.5 and 10 microns in diameter), and sulfur dioxide. USEPA promulgated standards for particulate matter in 1997 that were revised in part in 1996. Delaware County has been designated in nonattainment for the 1997 annual standard for particulate matter less than 2.5 microns in diameter. Marion and Morrow Counties are in attainment for all NAAQS (U.S. Environmental Protection Agency, 2011).

3.1.8 Climate

The climate of Ohio is continental in nature, characterized by moderate extremes of heat, cold, and precipitation, but climatic conditions across the state are varied. Summers are moderately warm and humid, while winters are cold but generally without extended periods of severe cold. For Delaware County, the average annual high and low temperatures are 84.6°F and 16.6°F, respectively. Delaware County averages 37.58 inches of precipitation annually. Prevailing winds are from the southwest (National Climatic Data Center, 2010).

3.1.9 Noise

Noise is generally defined as unwanted sound. The rural, undeveloped nature of the Project area and surrounding environments have few manmade noise sources that regularly contribute to the ambient noise level at most locations within the Project. Portions of the Project adjoining or near US 23 are exposed to varying levels of traffic noise from this roadway that decreases with distance from the traffic stream. Within the Project, the only noticeable sources of noise emanate from the vehicles of Project users and motorized boats on the lake. The lack of significant levels of human activity in this area results in ambient noise levels that are usually dominated by natural sources. Noise from these sources dissipate with distance from the source, so boat and motor vehicle traffic noise do not contribute to ambient noise levels in areas of the Project that are far removed from the lake, river, and roadways. Except for days when recreational traffic is heavier (e.g., holiday weekends), manmade sources of noise are generally dispersed to the level that ambient noise levels approach background noise levels emanating from natural sources such as wind and birds.

3.1.10 Toxic/Hazardous Wastes

A formal agency records and database search regarding possible issues related to site contamination from environmentally-regulated substances was not performed as part of this PEA. Such a search is routinely used to identify any past activities or incidents that may have resulted in generation or release of toxic and hazardous materials. Project lands do not appear to have any history of use or mishaps that could raise concerns about possible site contamination, with one possible exception. The existing shooting range may present a risk of contamination with heavy metals, particularly lead, from expended shot. An evaluation of the existing site by hazardous waste management specialists would have to be performed to determine if potential contamination exists, the level and extent of any such contamination, and whether site cleanup would be warranted before the site is converted to other uses.

3.2 Biological Environment

3.2.1 Vegetation

As described previously in Section 3.1.4, over 60 percent of the Project is forested. Older growth woodlands are located in the western portion of the Project that encompasses the State Park. These stands are characterized by oak, maple, beech, and hickory. Younger timber and other land cover types are located in the eastern portion of the Project, the wildlife area. The four major forest classifications that dominate the Project landscape consist of the following:

- **North-Central Interior Dry-Mesic Oak Forest and Woodland:** This forest type is found throughout the glaciated regions of the Midwest and can occur on uplands, near floodplains, or on rolling glacial moraines. Forest cover can range from dense to moderately open canopy and there is commonly a dense shrub understory. Fire-resistant oak species, in particular bur oak (*Quercus macrocarpa*), northern red oak (*Quercus rubra*), and/or white oak (*Quercus alba*), dominate the overstory. Hickories including shagbark hickory (*Carya ovata*), bitternut hickory (*Carya cordiformis*, and mockernut hickory (*Carya albaI)*, are diagnostic in portions of the range of this system. Depending on site location and the overstory canopy density, the understory may include species such as American hazelnut (*Corylus americana*), serviceberry trees (*Amelanchier* spp.), starry false lily of the valley (*Maianthemum stellatum*), blue cohosh (*Caulophyllum thalictroides*), wood nettle (*Laportea canadensis*), white trillium (*Trillium grandiflorum*), wild sarsaparilla (*Aralia nudicaulis*), and stinging nettle (*Urtica dioica*). Occasionally, prairie grasses such as *Andropogon gerardii* and *Panicum virgatum* may be present.

- **North-Central Interior Beech-Maple Forest:** This forest type is typically found on flat or rolling uplands with rich loam soil over glacial till and are characterized by a dense tree canopy, which creates a thick layer of humus and leaf litter developing a rich, dense herbaceous layer. Sugar maple (*Acer saccharum)* and American beech *(Fagus grandifolia)* comprise up to 80 percent of the canopy. Other species that comprise the canopy can include northern red oak (*Quercus rubra*), American basswood (*Tilia americana*), American hornbeam (*Carpinus caroliniana*), and American hophornbeam (*Ostrya virginiana*). The herbaceous layer is very diverse and typically includes Jack in the pulpit (*Arisaema triphyllum*), Clayton's sweetroot (*Osmorhiza claytonia*), smooth Solomon's seal (*Polygonatum biflorum*, and white trillium.

- **North-Central Interior Floodplain:** This forest type is found along rivers across the glaciated Midwest and is characterized by sugar maple, eastern cottonwood (*Populus deltoides*), willows (especially black willow [*Salix nigra*] in the wettest areas), and green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), and bur oak in more well-drained areas.

- **Appalachian Hemlock-Hardwood:** These forests are characterized by northern hardwoods such as sugar maple, yellow birch (*Betula alleghaniensis*), and American beech, either forming a deciduous canopy or mixed with eastern hemlock or eastern white pine. Other common and sometimes dominant trees include oaks (most commonly red oak), yellow-poplar, black cherry (*Prunus serotina)*, and sweet birch (*Betula lenta*) (NatureServe, 2007).

No known timber management activities have taken place in the State Park portion of the Project. The ODNR manages the vast majority of the Project, and the focus of the management for the State Park is recreation as opposed to wildlife or timber management. The remainder of the Project site is part of the Wildlife Area and is managed by the ODNR Division of Wildlife. The wildlife management plan for the area provides for a diversity of habitats for upland wildlife. Management techniques include sharecropping, planting of permanent nesting cover, manipulating timber stands, and periodic burning to control succession.

According to the ODNR Division of Wildlife, all natural habitats in Ohio are impacted by invasive plants. The most prominent invasive plant species known to occur in the Project area are autumn olive and purple loosestrife. Autumn olive was introduced to the United States in the 1830's from East Asia and can thrive in a variety of soil types. Autumn olive is considered a threat because it exhibits prolific fruiting and rapid growth which stifles the growth of native plants. Autumn olive can also disrupt the nitrogen cycle of the soil, which may impact native

plant species. Purple loosestrife was introduced from Europe in the early 1800's and adapts readily to disturbed wetlands. As it establishes and expands it out-competes and replaces native grasses, sedges, and other flowering plants. Purple loosestrife forms dense stands that reduce waterfowl habitat. Invasive species are problematic because they compete with native flora and fauna for the same resources. By definition, invasive species are species that are foreign to a particular region that out-compete native species for the same resources. If these species are not monitored and managed, they may affect the native ecology. Often the undesirable species can be managed chemically, mechanically, and/or physically.

3.2.2 Wetlands

The USACE and USEPA jointly define wetlands as areas inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. In general terms, wetlands can be described as the transition zone between upland and aquatic ecosystems. The USACE requires that a site must have suitable hydrology and must contain hydric soils and predominantly hydrophytic vegetation to be classified as a wetland. Functionally, wetlands are important landscape features because they hold and slowly release floodwater and snow melt. Another function of wetlands is to act as filters to cleanse surface water of iMaster Plan Updaterities, recycle nutrients, and trap sediment. Because these areas tend to be wet, have exposure to sunlight, and are highly fertile, wetlands support a diverse composition of flora and fauna.

According to the United States Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps, approximately 296 acres of wetlands exist within the Project area (Figure 3-10). The NWI maps are a generalized series of maps that give approximate locations of wetland areas using existing sources of information such as soil surveys, previous wetland recordings, and site observations. Based on NWI mapping, wetlands mapped in the Project area tend to occur mainly in the southeast and northern portions of the Project, are primarily isolated and scattered, and consist of relatively small areas typically averaging less than five acres in size. At the northern end of the Project area, there are several areas of forested wetlands along the banks of the Olentangy River just north of State Route 229 and north of Delaware Lake. There are similar pockets of forested wetlands along the northern bank of Whetstone Creek before it enters the lake. On the western side of the lake within the State Park area, there are three areas with scattered pockets of forested wetlands. The largest area of wetlands within the Project is located on the east side of the lake at the southern end of the wildlife area. This area abuts the eastern

portion of the main levee of the dam on the southern edge and lies between the lake and Horseshoe Road. The area consists of a managed wetland wildlife area with several ponds and the seasonal flooding of 159 acres and a mix of large tracts of both forested and emergent wetlands. The locations of the approximately 296 acres of wetland in the Project area are shown in Figure 3-10. Table 3-5 provides information about the different types of wetlands.

Table 3-5: Wetlands in Project Area

Wetland Type	Abbreviation[1]	Number of Sites	Approximate Total Acreage
Palustrine, emergent, temporary or seasonally flooded wetland	PEM	45	138.52
Palustrine, forested, broad-leaved deciduous, temporarily or seasonally flooded wetland	PFO	131	142.31
Palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded wetland	PSS	9	15.64

[1]Source: USFWS, 1979

3.2.3 Terrestrial Wildlife

According to the ODNR Division of Wildlife, the Project area supports a diverse array of amphibian, bird, mammal, and reptile species. The scientific and common names of the species most commonly found at the Project are listed in Table 3-6.

Table 3-6: Terrestrial Fauna Common to the Project Area

Taxonomy	Common Name	Scientific Name
Reptiles	Common snapping turtle	*Chelydra serpentina serpentina*
	Musk turtle	*Sternotherus odoratus*
	Red-eared slider	*Trachemys scripta elegans*
	Northern Copperhead	*Agkistrodon contortrix mokeson*
	Water snake	*Nerodia sp.*
	Garter snake	*Thamnophis sp.*
Mammals	White-tailed deer	*Odocoileus virginianus*
	Raccoon	*Procyon lotor*
	Squirrel	*Sciuridae*
	Cottontail rabbit	*Sylvilagus sp.*
	Woodchuck	*Marmota monax*
	Muskrat	*Ondatra zibethicus*
	Mink	*Neovison vison*
	Opossum	*Didelphis virginiana*

Table 3-6: Terrestrial Fauna Common to the Project Area

Taxonomy	Common Name	Scientific Name
Birds	Wild turkey	*Meleagris gallopavo*
	American crow	*Corvus brachyrhynchos*
	Tufted titmouse	*Baeolophus bicolor*
	White-breasted nuthatch	*Sitta carolinensis*
	Wood thrush	*Hylocichla mustelina*
	Ovenbird	*Seiurus aurocapilla*
	Scarlet tanager	*Piranga olivacea*
	Warbler	*Dendroica* spp.
	Yellow-billed cuckoo	*Coccyzus americanus*
	Pileated woodpecker	*Dryocopus pileatus*
	Barred owl	*Strix varia*
Amphibians	Marbled salamander	*Ambystoma opacum*
	Spotted salamander	*Ambystoma maculatum*
	Northern spring peeper	*Pseudacris crucifer crucifer*
	Bullfrog	*Rana catesbeiana*
	Green frog	*Rana clamitans melanota*

Source: ODNR, Division of Wildlife, 2011a

Wildlife populations are abundant in this region, in part because a large portion of the Lake is a wildlife area maintained and managed by the ODNR Division of Wildlife. Common game and fur species at Delaware Lake include cottontail rabbit, fox squirrel, ring-necked pheasant, mourning dove, opossum, woodchuck, muskrat, mink raccoon, red fox, and gray fox. Since reforestation following clearing for agriculture in the early nineteenth century, white-tailed deer populations have returned to the area and are a popular game species. Additionally, the southern flying squirrel (*Glaucomys volans*) can be found in mature beech-maple forests and the eastern chipmunk (*Tamias striatus*) can be found in deciduous woods. The masked shrew (*Sorex cinereus*), eastern mole (*Scalopus aquaticus*), fox, and mice may also be present in the Project (Friends of Alum Creek and Tributaries, 2005).

Resident populations of Canada geese, wood ducks, and mallards occur in the Project area. During the spring and fall migrations, these and other waterfowl species can be found in large numbers on the lake, ponds, and seasonally flooded marsh. Additionally, Delaware Lake hosts a variety of both nesting and migrant birds, making birding a popular activity at the Project. Of particular interest are the spring migrations of waterfowl and songbirds and the fall migration of

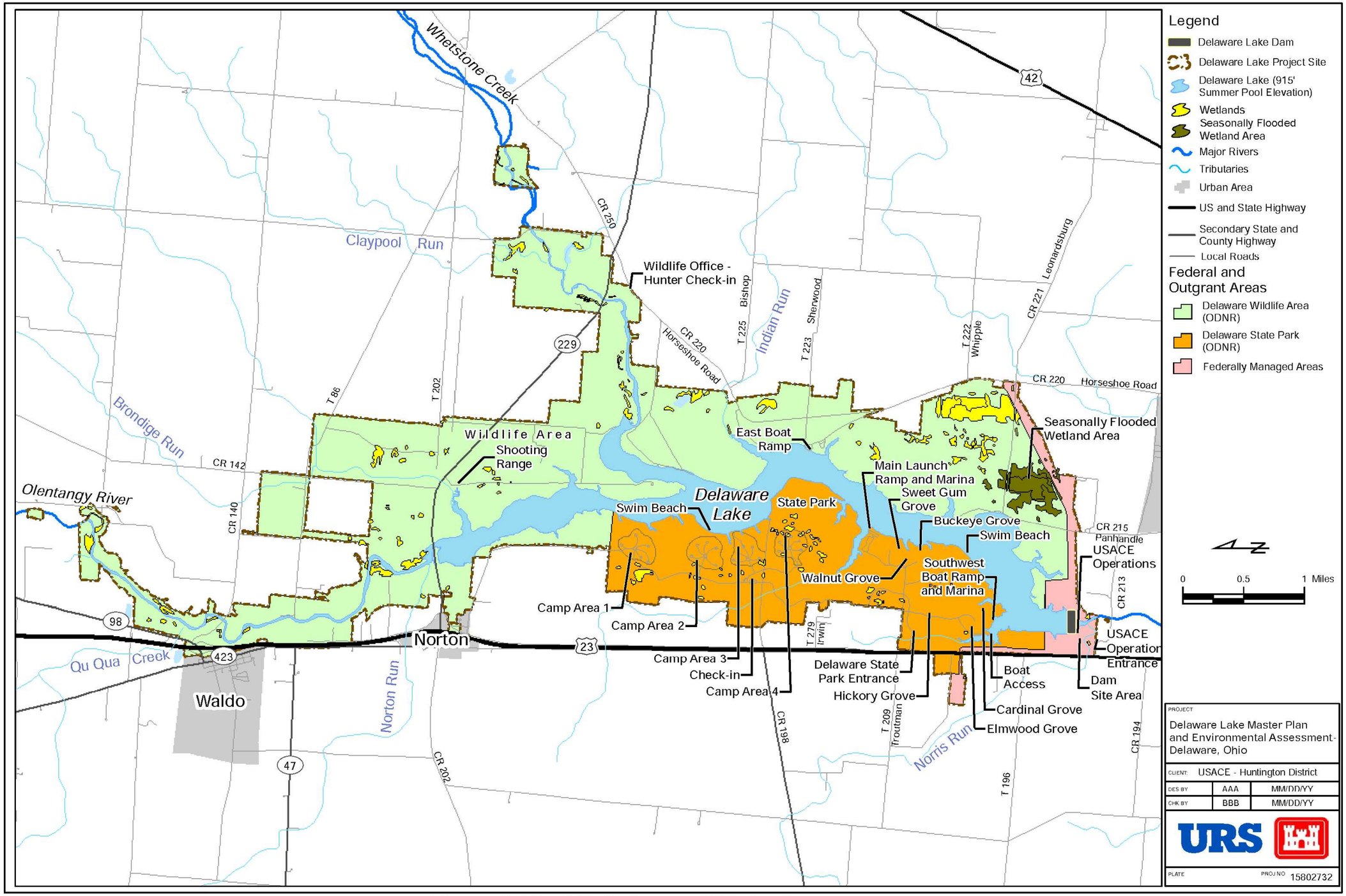

Figure 3-10: NWI-Delineated Wetlands

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hawks. Red-tailed hawks (*Buteo jamaicensis*), American kestrels (*Falco sparverius*), and northern harriers (*Circus cyaneus*) (marsh hawks) are commonly viewed during the summer over open fields and woodlots. Large numbers of turkey vultures (*Cathartes aura*) are also present during summer. Various rare and unusual birds have been spotted in the Project area including the bald eagle (*Haliaeetus leucocephalus*), northern goshawk (*Accipiter gentilis*), osprey (*Pandion haliaetus*), king rail (*Rallus elegans*), snowy owl (*Bubo scandiacus*), long-eared owl (*Asio otus*), great egret (*Ardea alba*), cattle egret (*Bubulvus ibis*), and sandhill crane (*Grus canadensis*). In 1994, wild turkeys were relocated from eastern Ohio to the Delaware Wildlife Area (ODNR, Division of Wildlife, 2011).

The ODNR Division of Wildlife has implemented various habitat development measures within the Wildlife Area. Several open grassland habitats are maintained along with several acres of agricultural fields that are planted in row crops such as millet to attract game birds including mourning dove (*Zenaida macroura*) and pheasant (*Phasianus colchicus*). Pheasants are also released each year by ODNR to increase harvest opportunities. Efforts to increase waterfowl-related recreational opportunities in the Wildlife Area have included the creation of 54 ponds and the seasonal flooding of 159 acres of wetland habitat in the southeast portion of the Project. The Olentangy Wildlife Research Station, which serves as the headquarters for statewide upland wildlife research, is located at the Project site. Many field research projects are conducted at the site and incorporated into the management efforts.

3.2.4 Aquatic Life

ODNR's Division of Parks and Recreation and Division of Wildlife oversee management of Delaware Lake. The Division of Parks and Recreation manages the land within the State Park while the Division of Wildlife oversees the operations on the lake and the Wildlife Area. Activities by the Division of Wildlife affecting the lake include fish stocking and population monitoring, angler harvest studies, and water quality analysis.

Delaware Lake provides habitat for many species. At the time of Project development, timber was left in many of the future cove areas so that it would be below the summer pool elevation to provide underwater habitat to benefit fisheries. The adjacent wetlands and shallow water areas provide additional spawning habitat as well as hunting areas for predator birds and other wildlife. Existing structure like rocky bottoms, sandy bottoms, pooling areas, rock outcrops, and grassy areas, all combine to provide habitat for aquatic life.

Delaware Lake is one of the best lakes in Ohio for white and black crappie fishing. Largemouth bass tournament fishing is also popular and Delaware Lake is consistently one of the top 10 lakes in the state for bass tournament results. Saugeye were stocked annually until 2010 by the ODNR Division of Wildlife, but, due to low survival rate and low angling success, saugeye are no longer stocked. Delaware Lake and the tailwater area support a diverse array of aquatic species. Some of the fish species found in the lake are listed in Table 3-7.

Table 3-7: Native and Stocked Fish Species in Delaware Lake

Common Name	Scientific Name
Bullhead (yellow, black, or brown)	*Ameiurus* spp.
White sucker	*Catostomus commersoni*
Spotfin shiner	*Cyprinella spilopterus*
Common carp	*Cyprinus carpio*
Gizzard-shad	*Dorosoma cepedianum*
Muskellunge	*Esox masquinongy*
Channel catfish	*Ictalurus punctatus*
Brook silverside	*Labidesthes sicculus*
Bluegill	*Lepmis macrochirus*
Smallmouth bass	*Micropterus dolomieui*
Largemouth bass	*Micropterus salmoides*
White bass	*Morone chrysops*
Emerald shiner	*Notropis atherinoides*
Bluntnose minnow	*Pimephales notatus*
Fathead minnow	*Pimephales promelas*
White crappie	*Pomoxis annularis*
Black crappie	*Pomoxis nigromaculatus*
Walleye	*Stizostedion vitreum*
Saugeye	*Stizostedion vitreum x S. canadense*

Source: ODNR, Division of Wildlife, 2011b

3.2.5 Rare, Threatened, and Endangered Species

Threatened or endangered species that may occur around the Project are listed in Table 3-8 below along with their state and federal status. USFWS maintains lists of rare plants and wildlife known to occur in each county of the United States. This list is based on historical site records and existing preferred habitats (USFWS, 2010b; ODNR, Division of Wildlife, 2011a).

Table 3-8: Listed Threatened and Endangered Species at Delaware Lake

Taxonomy	Common Name	Scientific Name	Federal Status	State Status
Freshwater Mussel	Clubshell Mussel	*Pleurobema clava*	E	E
	Rayed Bean Mussel	*Villosa fabalis*	PE	E
	Snuffbox	*Epioblasma triquetra*	PE	E
Reptile	Eastern Massasauga	*Sistrurus catenatus*	C	E
Mammal	Indiana Bat	*Myotis sodalis*	E	E

Source: USFWS, Threatened and Endangered Species in Ohio, 2010
E – endangered PE – proposed endangered C - candidate

Federally-protected species known to have occurred in Delaware, Marion, and Morrow Counties include the endangered Indiana bat (*Myotis sodalist*) and the endangered clubshell mussel (*Pleurobema clava*). The snuffbox (*Epioblasma triquetra*) and rayed bean mussel (*Villosa fabalis*) have legislation proposing each for listing on the federal endangered species list, but the listing action has not been published as yet in the Federal Register. The eastern massasauga (*Sistrurus catenatus*) is also a candidate species proposed for listing on the federal list. All five species are described below (U.S. Fish and Wildlife Service, 2010).

The Indiana bat is a mammal found in the eastern United States, from Oklahoma and northern Florida to New Hampshire. The Indiana bat uses two distinct habitat types during the course of a year: caves and under tree bark or in cavities of dead trees. In August the Indiana bat migrates south to limestone caves. In spring, the Indiana bat migrates north, where females establish maternity colonies beneath the loose bark of dead trees. Males tend to use caves during the summer. Occasionally both males and females have been found beneath the bark of living trees and in the cavities of dead trees. The Project area appears to have some suitable habitat for this species.

In response to Section 7 of the Endangered Species Act coordination conducted in connection with a 2006 PEA by the Federal Energy Regulatory Commission in similar habitat in the region, the USFWS recommended that tree clearing be restricted from April 1 to November 15 to avoid affecting summer roosting of Indiana bats. With implementation of this mitigation, the Federal Energy Regulatory Commission determined that the project may affect but is not likely to adversely affect Indiana bats.

The eastern massasauga is a small, venomous pit viper with a thick body and average adult length of two feet. Massasaugas live in wet areas including wet prairies, marshes, and low areas along rivers and lakes. In many areas, massasaugas also use adjacent uplands during part of the year. They often hibernate in crayfish burrows but they may also be found under logs and tree

roots or in small mammal burrows. The Project area appears to have some suitable habitat for this species.

The clubshell mussel has a triangular outline, a maximum length of 3.5 inches, and is typically tan or yellow in color (Michigan State University Extension). This mussel is found buried up to four inches in depth in medium to small rivers and prefers clean, loose sand and gravel substrates. Delaware Lake and its tributaries appear to have suitable habitat for this species.

The rayed bean is a small mussel usually less than two inches in length. The rayed bean mussel is typically found in smaller, headwater creeks, although it has been recorded in larger rivers. The mussels are usually found in or near shoal or riffle areas, and in the shallow, wave-washed areas of glacial lakes. Substrates typically include gravel and sand and it is often found buried among roots of vegetation (Ohio River Valley Ecosystem Team, 2002). As of this writing, this species has not been reported at the Project area.

The snuffbox mussel has a triangular shell generally two inches in length and is yellow or yellowish green in color with green rays or blotches. The snuffbox is typically found in medium to large rivers in clear, gravel riffles. At the time of this writing, this species has not been reported at the Project area.

While no longer listed as a threatened species, the bald eagle (*Haliaeetus leucocephalus*) is protected under The Bald and Golden Eagle Protection Act of 1940, the Migratory Bird Treaty Act of 1918, and the Lacey Act of 1900. The Bald and Golden Eagle Protection Act provides protection for the bald and golden eagles by prohibiting the take, possession, sale, purchase, barter, offer to sell, transport, and export or import of any bald or golden eagle, alive or dead, including any part, nest, or egg. The Migratory Bird Treaty Act protects birds that migrate across international borders. The Lacey Act protects bald eagles by making it a federal offense to take, possess, transport, sell, import, or export their nests, eggs, and parts that are taken in violation of any state, tribal, or U.S. law. Bald eagles occur and nest on Project lands. Areas in the Wildlife Area provide appropriate nesting and foraging habitat for this species.

There is no designated critical habitat under Section 7 of the Endangered Species Act present within the Project area. The ODNR Division of Natural Areas and Preserves has not identified any State Nature Preserves or State Natural Areas within the Project area (ODNR, Division of Natural Areas and Preserves, 2011).

3.3 Socioeconomic Environment

3.3.1 Population and Employment

The Master Plan Update defined the area of influence for Project recreation users as the area where the majority of the visitors to the Project live. Based on the nature of the recreational activities provided at the Project, the vast majority of the visitors will reside within a one-hour driving distance. Therefore, this distance was used to define the overall area of influence.

This area of influence was divided into two subareas as follows (Figure 3-11):

- **Primary Area of Influence:** The area within a 30-minute drive of the Project. Due to their proximity, residents in the primary area of influence are expected to make the Project a destination for all of the recreational opportunities available at the Project.

- **Secondary Area of Influence:** The area between a 30- and 60-minute drive of the Project. Residents in the secondary area of influence are expected to visit the Project for specific reasons (e.g., golf); however they are not expected to make the Project a destination solely for general day-use activities (such as picnicking) that are also available in their local area.

There are two counties within the majority of the primary area of influence and six counties within the secondary area of influence. The primary area of influence consists of Delaware and Marion Counties in OH. The secondary area of influence includes portions of Crawford, Franklin, Logan, Morrow, Union, and Wyandot Counties, all in Ohio.

Demographic data (population and age) were compiled from data reported by the U.S. Census Bureau and regional and State data centers. These data were analyzed to determine the population within the areas of influence and how that population is projected to change by 2020. The 2020 population projections were determined by the Ohio Department of Development in 2003 using the 2000 Census data. The populations of the counties in the area of influence are projected to increase at different rates. The projected percentage change was determined for each area of influence based on the change in the estimated population in each county.

The estimated populations for the primary and secondary areas of influence are displayed in Table 3-9. The population in the primary area of influence is projected to increase by 60.4 percent by 2020. The population in the secondary area of influence is projected to increase by 16.0 percent by 2020.

Table 3-9. Existing and Projected Population in Areas of Influence

Area of Influence	2000 Population	2010 Population Estimate	2020 Projection	Projected Growth 2000–2020
Primary	176,206	240,715	282,670	60.4%
Secondary	1,257,394	1,362,798	1,458,700	16.0%

Source: Ohio Department of Development, 2003, and U.S. Census Bureau, 2011

Changes in the percentage of the population in each age group were based on projected changes at the county level from the Ohio Department of Development. The analysis combined the county estimates to estimate the percent change in each age group for each area of influence, as shown in Table 3-10. Within the primary area of influence, the percentage of people 19 and under is projected to decrease from 29.4 percent in 2000 to 26.8 percent by 2020. The percentage of young adults between the ages of 20 and 44 is also expected to decrease, from 37.1 percent in 2000 to 34.1 percent in 2020. The percentage of adults between 45 and 64 is expected to grow significantly, from 23.4 percent in 2000 to 27.1 percent in 2020. The percentage of people over 65 is projected to increase from 10.1 percent in 2000 to 12.0 percent by 2020.

Table 3-10: Age Distribution of Population by Area of Influence

Age Group	Primary			Secondary		
	2000	2010	2020	2000	2010	2020
<5	7.2%	7.0%	6.4%	7.2%	7.0%	6.9%
5-19	22.2%	22.4%	20.4%	21.2%	20.1%	20.0%
20-44	37.1%	32.2%	34.1%	40.8%	37.6%	35.6%
45-64	23.4%	27.6%	27.1%	20.6%	24.7%	24.8%
≥65	10.1%	10.8%	12.0%	10.3%	10.5%	12.7%

Source: Ohio Department of Development, 2003, and U.S. Census Bureau, 2011

The median incomes of the households in the areas of influence were estimated using a weighted average of the average 2009 median incomes of the counties in the area of influence. The median household income in the primary and secondary areas of influence was $72,672 and $47,581, respectively, in 2009. These compare to the median household income for the entire State of Ohio of $45,467 and to the United States of $50,221.

Employment by industry category in Delaware, Morrow, and Marion Counties as of 2010 is summarized in Table 3-11. The top ten employers in all three counties as of 2010 are listed in Table 3-12. The data in the tables highlight the importance of the trade, transportation, and utility sector to the economies of all three counties. Manufacturing and government employment are more important to Morrow and Marion Counties than to Delaware County, while the professional and business services sector is a dominant area of employment in Delaware County, possibly reflecting the spread of white collar jobs expanding outward from the Columbus

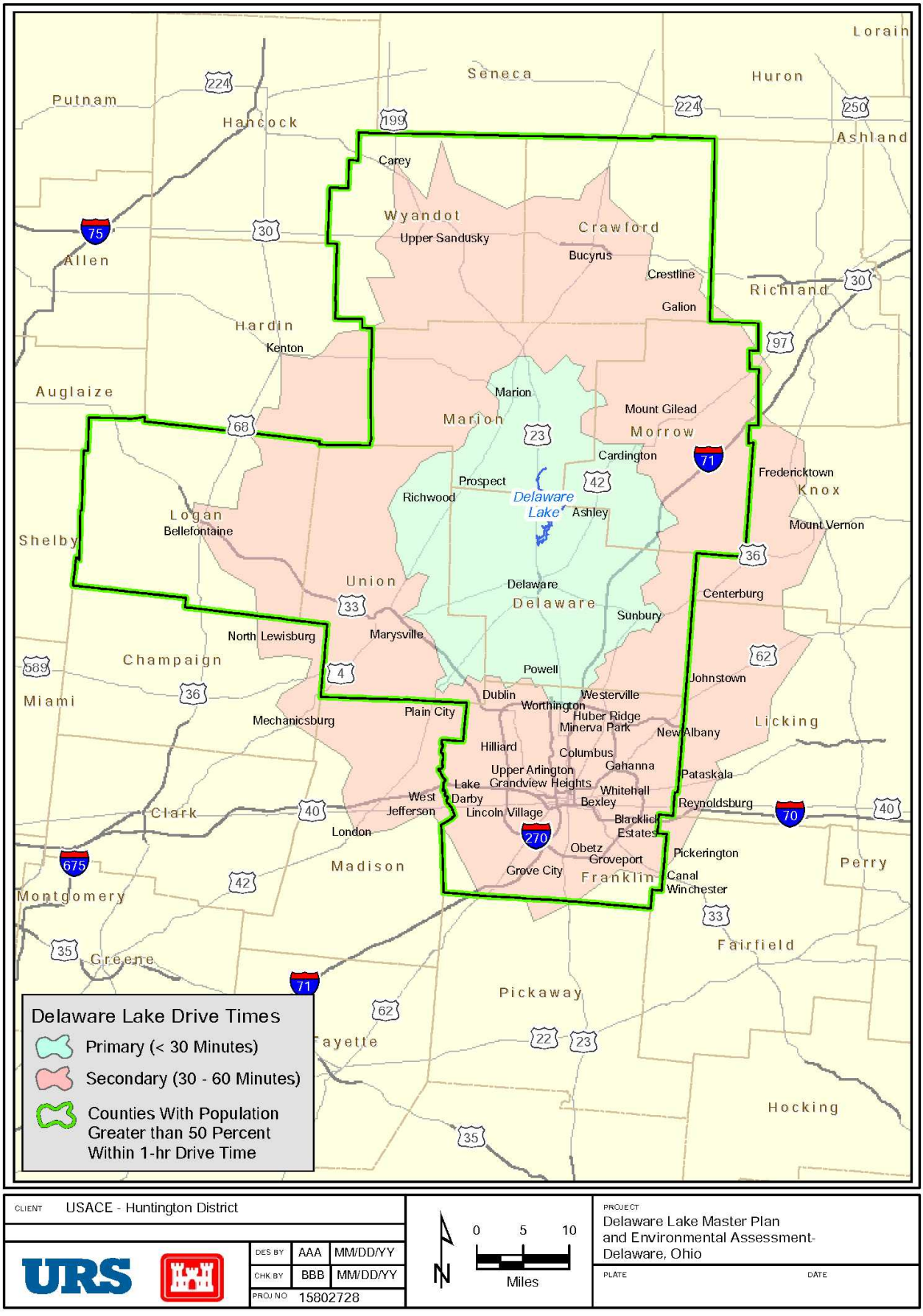

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Figure 3-11: Area of Influence

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metropolitan area during the past decade. Local school districts are a top-ten employer in all three counties.

Table 3-11:
2010 Delaware, Morrow, and Marion County Civilian Employment by Industry Category

Industry Category	Delaware County		Morrow County		Marion County	
	Employment	Percent of Total County Work Force	Employment	Percent of Total County Work Force	Employment	Percent of Total County Work Force
Natural resources and mining	299	0.43%	54	0.98%	106	0.39%
Construction	2,644	3.80%	310	5.65%	722	2.65%
Manufacturing	6,113	8.78%	1,126	20.54%	6,935	25.42%
Trade, transportation, utilities	15,008	21.56%	866	15.79%	4,413	16.18%
Information services	896	1.29%	68	1.24%	801	2.94%
Financial services	5,101	7.32%	114	2.08%	717	2.63%
Professional, business services	13,938	20.1%	153	2.79%	1,576	5.78%
Education, health services	6,069	8.71%	578	10.54%	3,223	11.82%
Leisure and hospitality services	9,765	14.1%	450	8.21%	2,210	8.10%
Other services	1,824	2.62%	59	1.08%	751	2.75%
Federal government	257	0.37%	61	1.11%	144	0.53%
State government	911	1.31%	83	1.51%	1,457	5.34%
Local government	6,817	9.79%	1,561	28.48%	4,223	15.47%
Total	**69,642**	**100.00%**	**5,483**	**100 %**	**27,278**	**100%**

Source: Ohio Department of Development, Office of Policy Research and Strategic Planning, 2011

Table 3-12: Top Ten Employers in Delaware, Morrow, and Marion Counties in 2008

Order of Importance	Delaware County Employers	Morrow County Employers	Marion County Employers
1	Delaware City Schools	Berkshire Hathaway/Scott Fetzer/Stahl	Anderson Corp./Silver Line
2	JP Morgan Chase & Co.	Cardington-Lincoln Local Schools	ConAgra Foods Inc.
3	Kroger Co.	Core Systems LLC	Marion City Schools
4	McGraw Hill Companies	Highland Local Schools	Marion County Government
5	Ohio Wesleyan University	Kroger Co.	Marion General Hospital Inc.
6	Ohio Health/Grady Memorial Hospital	Morrow County Hospital	Nucor Corp.
7	Olentangy Local Schools	Mt. Gilead Exempted Village Schools	Smith Clinic
8	PPG Industries	Northmor Local Schools	State of Ohio
9	Showa Corp./American Showa Inc.	Yutaka Giken/Cardington Yutaka Corp.	Verizon Communications Inc.
10	State of Ohio	---	Whirlpool Corp.

Source: Ohio Department of Development, Office of Policy Research and Strategic Planning, 2011

3.3.2 Environmental Justice

Executive Order (EO) 12898, *Federal Action to Address Environmental Justice in Minority Populations and Low Income Populations*, and the February 11, 1994 Presidential Memorandum providing guidance for this EO, require federal agencies to develop strategies for protecting minority and low-income populations from disproportionate and adverse effects of federal programs and activities. The EO is "intended to promote non-discrimination in federal programs substantially affecting human health and the environment." Generally, as part of an environmental justice analysis, the percentages of low income and minority persons are calculated to estimate the likelihood that such populations may exist in areas potentially affected by the proposed actions and be disproportionately impacted by these actions.

As of July 2011, only limited data from the 2010 Census were available as yet from the U.S. Census Bureau. Population estimates and estimates of certain population statistics were available for 2008. These data were reviewed to determine total population and racial composition of Ohio as a whole and, separately, for Delaware, Marion, and Morrow Counties, which are the areas that would be most affected by the Proposed Action. The total 2010 population of Ohio was 11,536,504. Based on 2008 Census Bureau population estimates, minorities accounted for 17.5 percent of the total population for the State as a whole. The total 2010 population of Delaware, Marion, and Morrow Counties was 174,214; 66,501; and 34,827, respectively. Based on 2008 estimates, minorities accounted for approximately 11.4 percent, 1.6 percent, and 3.1 percent of the total population of Delaware, Marion, and Morrow Counties, respectively. Statistics about income and poverty have not yet been released for the 2010 Census (U.S. Census Bureau, 2011).

Because 2010 Census block level and block group data are not yet available, 2000 Census data were reviewed. In 2000, minorities represented approximately 15.9 percent of the population of the State as a whole, while minorities represented roughly 6.4 percent, 8.5 percent, and 2.0 percent of the total population of Delaware, Marion, and Morrow Counties, respectively. Also in 2000, 10.3 percent of the total state population was below the poverty level, while the portions of the populations of Delaware, Marion, and Morrow Counties below the poverty level were 3.7 percent, 9.0 percent, and 8.9 percent, respectively. Delaware County has experienced considerable growth and development since 2000, spurred by the growth of the nearby City of Columbus and Franklin County. For this reason, the 2000 Census data may not represent a valid picture of the population characteristics of the Project locale.

3.3.3 Transportation and Traffic

US Highway 23 runs north-south parallel and adjacent to the Project area. US 23 experiences significant traffic volumes, however, improvements to US 23 are currently under construction to accomodate the high traffic volumes on this road. Primary entrances to the Dam Site Recreation Area and the Delaware State Park are from US 23. The entrance road from US 23 to the State Park experiences minimal congestion and maintains good traffic flow. The entrance to the Dam Site Recreation Area has experienced some delays entering and exiting the Project. However, improvements to US 23 should improve traffic flow into and out of the Dam Site Recreation Area.

US Highway 42 runs north-south approximately 2 miles to the east of the Project area. US 23 and US 42 both intersect with U.S. Highway 36 which provides access to the City of Delaware and a connection to Interstate 71.

State Route 229 runs east-west and provides access to the Wildlife Area traversing the Project area at the north end connecting U.S. Highways 23 and 42. These roadways are rural in nature and experience very minimal congestion.

Current on site congestion associated with vehicular traffic is typically associated with lack of parking or inefficient boat ramp operations and associated parking.

Overall peak traffic associated with recreation at the Project is typically during weekends, holidays, and after work hours and typically does not impact peak hour traffic conditions associated with commute to work travel.

3.3.4 Recreation

The Project provides a wide range of recreational activities. Table 3-13 lists the recreational activities that are available at the Project, locations, and the available facilities. The recreational activities are grouped by major type of recreational pursuit. Figure 3-12 shows the locations of the recreation areas at the Project.

Table 3-13: Recreational Activities at the Project

Recreational Activity	Location	Description
Boating	Delaware Lake	• 1,300 acres
	Elmwood Grove (Southwest Marina)	• 2-lane boat ramp • 32 boat slips • Parking for vehicles and trailers
	Marina	• 2-lane boat ramp • 144 boat slips • Parking for vehicles and trailers
	Sherwood Road	• 2-lane boat ramp will be reconfigured to 1-lane ramp • Parking for vehicles and trailers
Camping/Overnight	State Park Campground	• 211 campsites spread over four areas • 2 group youth camp areas • 3 rental yurts • Bathhouse for each of the four camping areas
	Delaware Lake	• Boat camping occurs in designated areas
Fishing	Below Dam Area	• Access to tailwater area provided
	Delaware Lake	• Access available from shore or boat
	State Park Day Use Areas	• Shore fishing access provided at these areas
	Wildlife Area	• 55 ponds throughout the 4,760 acres
Hunting	Wildlife Area	• 4,760 acres of designated hunting
Other Activities (e.g. hiking, golfing)	State Park Campground	• Amphitheater is located near the campground Welcome Center • Nature Center is also located near the campground Welcome Center
	Hiking	• Trails located throughout Delaware State Park o Big Foot Trail, 1.5 miles o Fisherman Trail, 0.25 miles o Lakeview Trail, 1.6 miles o Briar Patch Trail, 1.5 miles o Mink Run Trail, 1 mile
	Marina	• Sledding hill located near the marina
	Sweet Gum Grove Day Use Area	• 18-hole disc golf course located at the Sweet Gum Grove day use area • Ice skating pond located at the Sweet Gum Grove picnic area

Table 3-13: Recreational Activities at the Project

Recreational Activity	Location	Description
Picnicking	Beach	• Picnic tables and grills located throughout the area
	Below Dam Area	• Picnic shelters, tables, and grills located throughout the area
	State Park Day Use Areas	• Picnic shelters, tables, and grills located throughout the area
	Marina	• Picnic tables and grills located throughout the area • Concession stand
Sightseeing	Below Dam Area	• Views of the lake, dam and the scenic Olentangy River
	State Park Day Use Areas	• Day use areas have scenic views of lake
Swimming	Beach Area	• Designated shore swimming area
	Camp Area 2	• Designated shore swimming area
	Delaware Lake	• Swimming occurs from watercraft in designated areas
Waterskiing	Delaware Lake	• Approximately 790 acres suitable for waterskiing

A description of the major recreational areas and facilities at the Project is presented below.

- **Dam Site Area.** The 25 acres surrounding the entrance to the USACE Operations Headquarters and the dam structure have been developed into a recreation site as well as an operations center. One of the existing USACE residences has been remodeled to accommodate the administrative personnel and activities of the headquarter operations. This facility also serves as a public reception site since there is no visitor center at the Project. The Dam Site Recreation Area at Delaware Lake is located three miles north of the City of Delaware on US Highway 23 and provides two group picnic shelters, playground areas with play equipment, picnic tables and grills, recently improved volleyball courts, parking for Project area users, and interpretive kiosks/information boards. The tailwater area downstream of the dam is the beginning of the reach of the Olentangy River that is designated as an Ohio Scenic River. The tailwater area is used for fishing and is primarily accessed by walking from the parking areas or along the hiking trails from the picnic area. There is a gated road that extends close to the water in this area with turnaround space but no parking. The Dam Site includes a scenic overlook with benches for observing the lake and stairs that lead down to near the water's edge. The area across the top of the dam is pedestrian accessible, with platforms on the southern side of the structure for viewing the discharge of the tailwater.

- **Delaware State Park Day Use Areas.** The day use area of Delaware Lake State Park, operated by ODNR, is located in the southern portion of the western side of the lake. The day use area is subdivided into eight subareas that are described below.

  - **Buckeye Grove.** The Buckeye Grove day use area is near the mid-point of the lake and is accessed from Park Road 21 to Park Road 25. About 13 acres have been developed for picnicking and lake access. This area has picnic tables, charcoal grills, a playground, and an open recreation area. The site also contains a picnic shelter with picnic tables and charcoal grills, a volleyball court, and lake and trail access. The 18-hole disc golf course extends into the area surrounding the Buckeye Grove site.

  - **Hickory Grove.** The Hickory Grove day use area encompasses approximately 20 acres and is located on Park Road 22 near the intersection with the main Park Road 21. This site serves as a picnic area with picnic tables and charcoal grills. Part of the area was formerly an isolated group camp for fly-in campers with a 1,950-foot long landing field adjacent to the existing picnic area.

  - **Elmwood Grove.** The Elmwood Grove day use area encompasses approximately 20 acres located at the ends of Park Roads 22 and 23. The day use area serves as a fishing access point and provides a two-lane boat ramp, picnic areas with tables and grills, an open recreation area, a playground, and floating boat docks. This is also referred to as the Southwest Marina.

  - **Sweet Gum Grove.** The Sweet Gum Grove day use area, located at the termini of Park Roads 21 and 25, encompasses 12 acres and includes an 18-hole disc golf course, picnic tables and grills, and an ice skating pond.

  - **Walnut Grove.** The Walnut Grove day use area encompasses five acres and is located adjacent to Buckeye Grove on Park Road 25. The Walnut Grove day use area provides facilities for picnicking, and the 18-hole disc golf course extends into the area adjoining Walnut Grove.

  - **Cardinal Grove.** The Cardinal Grove day use area is approximately 20 acres in size and is located in the extreme southwest section of the park at the end of Park Road 22. This site offers picnicking and pedestrian fishing access and overflow vehicle-trailer parking for the Elmwood Grove boat ramps.

- **Beach.** The beach area is located at the end of Park Road 28 near the other day use areas. This area includes approximately 15 acres of land with a man-made sand beach for swimming, a sand volleyball court, a small playground with a swing set, tetherball, and picnic tables with charcoal grills.

- **Marina.** The Project provides a marina and associated facilities situated on 30 acres of land. The marina is accessed via Park Road 21 and Park Road 25. The marina has two boat ramps with parking for 150 boat trailers, 144 boat slips on floating docks, two fueling stations picnic areas with tables and grills, and concessions and vending. Nearby is a sledding hill developed from lake dredged material and a small picnic area with tables and charcoal grills. The trailhead for the one-mile long Mink Run Trail is located in this area.

- **Delaware State Park Campground.** The Delaware Lake State Park entrance and Camp Welcome Center are located on Park Road 27/Camp Road. The Welcome Center includes a large parking area with picnic tables and a shuffleboard court. Located near the Welcome Center are a nature center and an amphitheatre. The partially wooded campground is subdivided into four separate camping areas with amenities including group camping areas, hiking trails, and boat slips. The camping areas are similar and offer parking, picnic tables, fire rings/grills, electric hookups, and access to hiking trails. Specific amenities at each camping area are described below.

- **Camping Area 1** includes 57 campsites, a playground with swings, a basketball court, tetherball, a horseshoe pit, boat tie-ups located on bulkheads, a designated youth camping area, and access to both the lake and Big Foot Trail.

- **Camping Area 2** offers 57 campsites, a playground with swings, a basketball court, tetherball, a horseshoe pit, a softball field, boat tie-ups on bulkheads, and access to the lake and to both the Big Foot Trail and the Fisherman's Trail. A boater's swim area is located offshore of this area.

- **Camping Area 3** contains 47 campsites and three rental yurts, a playground with swings, a basketball court, tetherball, a horseshoe pit, boat tie-ups located on bulkheads, a designated youth camping area, and access to the lake and to both the Big Foot Trail and the Lakeview Trail.

- **Camping Area 4** has 50 campsites, a playground with swings, a basketball court, tetherball, a horseshoe pit, and access to the lake and to the Briar Patch, Mink Run, and Lakeview Trails.

- **Delaware Lake Wildlife Area.** The Delaware Lake Wildlife Area encompasses approximately 4,670 acres and is operated by ODNR. The Delaware Lake Project allows hunting, trapping, and fishing within designated areas. The Wildlife Area is separated into four general areas for recreational use: the Southeast Area, the East Area, the Cap Cole Area, and the Northeast Area. The Wildlife Area is divided into 15 management units that are primarily located on the eastern side of the lake with two units located on the northwestern side of the lake north of the camping area. The Sherwood Road boat ramp, located in the East Area, currently has a two-lane boat ramp, but future improvement plans will reconfigure it into a single lane. Hand boat ramps are located throughout the Wildlife Area in the Southeast, Cap Cole, and Northeast areas. Hunting for rabbit, dove, pheasant, turkey, and deer is allowed seasonally. Pheasant are released each year to increase harvest opportunities for this game bird. In addition to the lake, 55 ponds with populations of black bass, white bass, bluegill, crappie, saugeye, and catfish, as well as 159 acres of managed marshlands know as the "Big Marsh Area" located at the extreme southern end of the Wildlife Area, support fishing and/or waterfowl hunting. Trapping for muskrat, raccoon, and mink is also permitted. Additionally, the Project has a dog training field and a shooting range with three separate ranges for handguns, rifles, and shotguns/trap shooting in the Northeast Area. There is also an archery range located in the Northeast Area between County Road 156 and County Road 21.

- **Delaware Lake.** Management responsibilities for Delaware Lake are shared by the USACE and ODNR. The summer pool of the lake is approximately 1,300 acres, but it drops to 950 acres during the winter. The lake is used by motorized boats as well as canoes and kayaks. Approximately 480 acres of the lake are designated as no wake zones during the summer. Boat access to the lake is provided at three locations with boat ramps along with three hand launch areas located throughout the Wildlife Area. The three main boat ramps are located at the marina, Sherwood Road, and Elmwood Grove. The marina and Elmwood Grove each have a two-lane boat ramp while the Sherwood Road ramp is being reconfigured into one lane. In addition to boat ramps, fishing from the shore is available at various locations around the lake. Delaware Lake offers excellent fishing for crappie, muskellunge, and largemouth and smallmouth bass. Other popular fishing activities include ice fishing, fishing for saugeye below the dam during cold weather, and fishing during the spring migration of bass from the Olentangy River and Whetstone Creek.

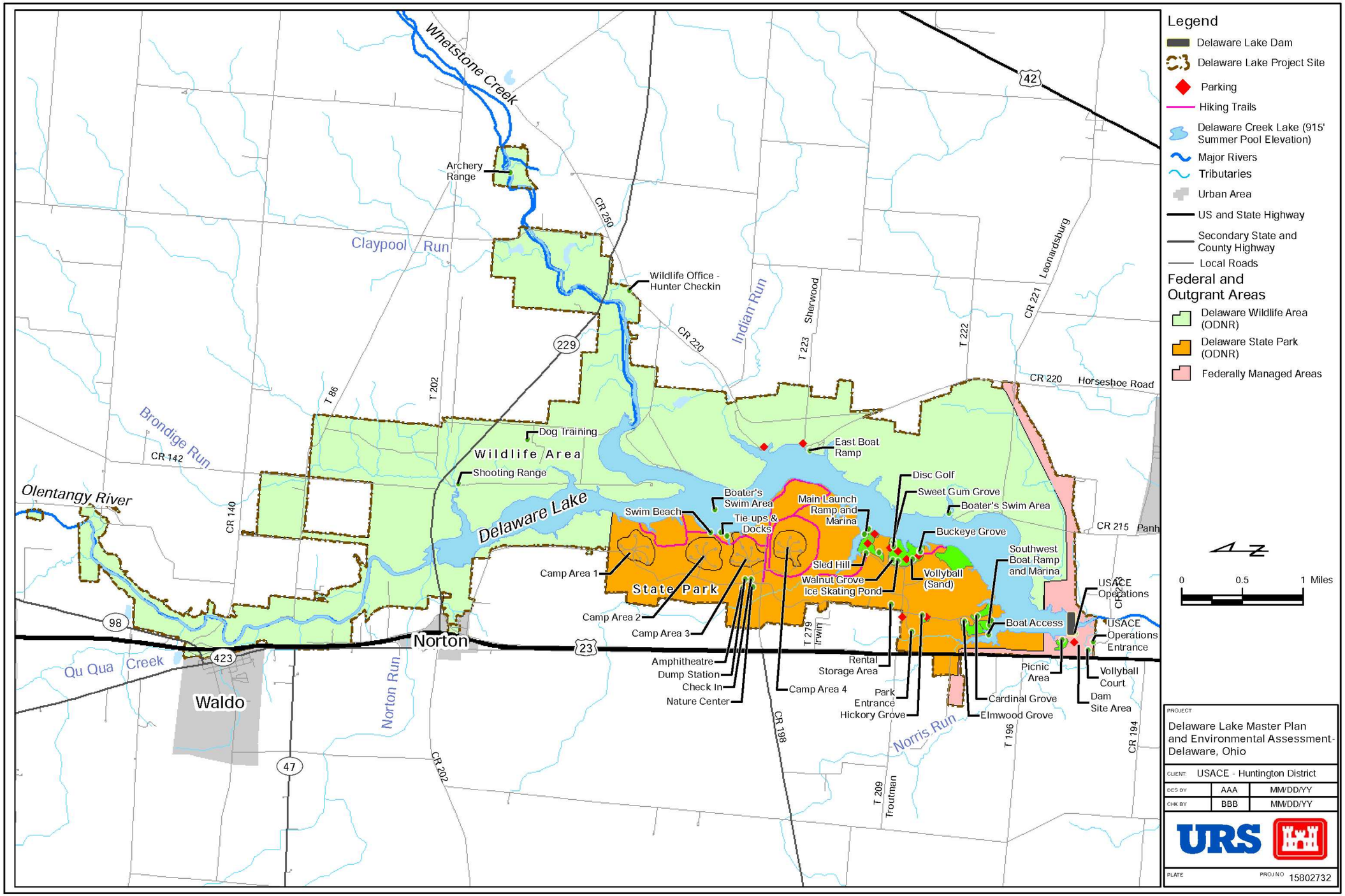

Figure 3-12: Existing Recreational Areas and Major Facilities

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3.3.5 Historic and Prehistoric Resources

A historic property, as defined by the Advisory Council on Historic Preservation, is a prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places (NRHP). A historic property includes artifacts, records, and remains that are related to, and located within, these National Register properties.

A Historic Properties Management Plan (HPMP) was completed for the Project area in the fall of 2004. The HPMP provides a summary of fifty-three archeological sites, as well as one structure, that have been identified within the reservoir from the mid 1940's through 2004. Surveys were done for the USACE or as research projects. Identified archeological sites were primarily prehistoric (52) dating from the Paleoindian (11,500-9,950 B.C.) through the Late Prehistoric (1000-1750 A.D.) temporal periods. Only one site has a historic Euro-American affiliation.

The Project area is divided into three distinct impact zones: conservation pool (below 910' Above Mean Sea Level [AMSL]) which is permanently inundated, littoral zone (910 to 915' AMSL) which is impacted by seasonal fluctuations between the winter and summer pools, and upland zone (above 915' AMSL) which includes all remaining land in the Project area. Only one archeological site is located in the conservation pool, three are located in the littoral zone, thirty-eight are located in the upland zone, and eleven are unspecified.

Two of the fifty-three recorded sites, Sites 33Dl12 and 33Mn18 are listed on the NRHP. Site 33Dl11 is potentially eligible for the NRHP but requires additional research. All three sites are located in the upland zone. Site 33Dl12 is a mound complex, Site 33Mn18 is a historic fort, and Site 33Dl11 is an open habitation.

Four identified sites are considered ineligible for the NRHP and no further work is required. These sites are listed as 33Dl104, 33Dl105, 33Dl220, and 33Dl221 and are located in the upland zone. Three sites have been destroyed. These sites are listed as 33Mn7, 33DlMn8, and 33Mn9 and are located either in the upland zone or the location is unknown. Site 33Dl107 is located in the inundation zone and the site's eligibility is unknown. Further investigation is proposed for the remaining sites to determine if they meet NRHP eligibility criteria. Summaries, NRHP eligibility, and impact zones for each site have been provided in Appendix B of the 2004 HPMP.

Since the 2004 HPMP, only one additional systematic survey has been completed within the reservoir. This 2011 survey was conducted along the Dam Site Recreation Area and the shoreline near summer pool, thereby limiting newly identified sites to only a portion of the

upland and littoral zones. This survey recorded forty-seven sites, two of which (33Dl8 and 33Dl10) were previously recorded. The majority of the sites were lithic scatters (16), isolated finds (15), and farmsteads/homesteads (10). Two of the recorded sites were determined to be potentially eligible for the NRHP (DEL-05-FS09 and DEL-05-FS14), five were determined ineligible and require no further work (DEL-01-FS06, DEL-01-FS07, DEL-05-FS03, DEL-05-FS08, andDEL-05-FS11), and the remainder were unknown and require further investigation. Sites were not formally recorded on standard site forms and provided to the Ohio Historic Preservation Office.

Only two additional known surveys, other than the 2011 survey, have been conducted within the Project area since the HPMP. The first survey is a 2008 marina launch ramp area at Delaware Lake State Park. This survey did not encounter cultural resources. The second survey is a 2010 bridge replacement survey on Whetstone Creek (Ohio Department of Transportation, 2010). This survey encountered three archeological sites, 33Mw165, 33Mw168, and 33Mw178. Sites 33Mw165 and 33Mw168 are not eligible for the NRHP and no further work is required. Site 33MW178 was not fully assessed and it is recommended that the site should be subjected to further investigation.

3.3.6 Aesthetics

As described previously, the topography of the Project area is characterized as generally flat to gently rolling with a few dissected ravines and bluffs. This terrain, in combination with the lake and some forested landscape areas, creates an overall scenic environment with opportunities for scenic vistas and view sheds. View distances range from small coves and glimpses of the lake along park and local roads to panoramic views of the lake and surrounding lands from the dam itself. The forests have a combination of mature growth trees and understory trees (such as hazelnut and serviceberry), creating a visually appealing environment. The vegetation of the Project offers changes in color, texture, and size that vary by topography, vegetation type, and season. Fall foliage forms a colored collage that supports sightseeing.

Thirty-five miles of shoreline, numerous picnic areas, and abundant hiking trails offer opportunities to enjoy scenic vistas at Delaware Lake State Park. These views are typically characterized by panoramic cross-water views. Other scenic vistas exist on higher banks located within the park areas and wildlife area, especially those with views of the water and adjacent floodplains, which are lined with vegetation and mature trees that provide an attractive contrast to the open fields in the area.

Vistas of the lake are possible at many points from roads and hiking trails. Of particular interest is a scenic overlook at the Dam Site. The Dam Site affords an excellent view of the lake from overlook areas that include benches for observing the lake and stairs that lead down to the water's edge. The area across the top of the dam is pedestrian accessible, with overlook platforms on the southern side of the structure for viewing the discharge of the tailwater, although there is no access to the tailwater area from the top of the dam. The view of Delaware Lake from the dam is shown below in Figure 3-1.

Photograph 3-1: View from Scenic Overlook at the Dam Site

The Olentangy River is designated as an Ohio Scenic River beginning at the discharge from the Delaware Dam and extending downstream to old Wilson Bridge Road in Worthington.

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4.0 ENVIRONMENTAL IMPACTS OF PROPOSED ACTION

4.1 Physical Environment

4.1.1 Topography

4.1.1.1 No Action

The No Action Alternative would generate no impacts on Project area topography.

4.1.1.2 Proposed Action

Similar to the No Action Alternative, the Proposed Action Alternative would have no adverse effects on topography.

4.1.2 Geology and Mineral Resources

4.1.2.1 No Action

Under the No Action Alternative, no new proposed facilities or measures recommended in the 2011 Master Plan Update would be implemented. Any leasing of minerals owned by the federal government would continue under the control of the BLM. Because the demand for oil and/or natural gas is increasing, there is potential for new extraction operations for minerals in the Project area. Oil and/or natural gas are leasable minerals governed by the Mineral Leasing Act of 1920 (30 U.S.C. §§ 181-263) and the Mineral Materials Act of 1947 (30 U.S.C. §§ 351 et seq.). At the present time, there are no proposals for mineral extraction or mineral exploration on Project lands.

4.1.2.2 Proposed Action

No impacts on geology or mineral resources would occur under the Proposed Action. Geotechnical evaluations would be performed to determine any risk of construction of recommended actions in areas of geologic concern such as highly erodible or unstable slopes. However, it does not appear that the proposed recommendations in the Master Plan Update would have any adverse effects on areas where geological concerns may exist and, consequently, pose no risk of impact on geological resources. None of the Project recommendations would have any effect on possible future leasing of mineral rights or mineral extraction.

4.1.3 Soils

4.1.3.1 No Action

Under the No Action Alternative, no new proposed facilities or measures recommended in the 2011 Master Plan Update would be implemented. Total Project visitation is expected to increase, and certain facilities within the Project may see even greater usage due to improvements implemented by the USACE that are not part of the Master Plan Update. The USACE and other resource agencies responsible for outgrants would monitor any areas that are susceptible to erosion from higher recreational usage as well as from users accessing new or less congested areas of the Project, potentially resulting in the creation of social trails, trampling of vegetation on the edge of existing campgrounds, or overuse of existing trails. As a result, the potential for increased erosion would be minimized. To further minimize adverse impacts on soils, the USACE and other resource agencies responsible for outgrants would implement protective measures such as closing off eroded areas and installing structural erosion control measures as warranted.

4.1.3.2 Proposed Action

Implementation of Master Plan Update recommendations would provide additional Project amenities that could generate an increase in visitation (e.g. additional recreational vehicle campsites). The USACE would monitor areas that are susceptible to erosion from increased usage. To minimize potential adverse impacts on soils, the USACE would implement protective measures such as closing off eroded areas and installing erosion controls as needed in impacted areas.

The vast majority of Project lands are flat or gently rolling with minor terrain relief (Figure 3-1). Consequently, it is not expected that erosion would be a major consideration associated with construction of the proposed recommendations. Areas where slopes are less than 15 percent and have less potential for erosion than steeper areas are more suitable for recreational use. The areas proposed for the construction of facilities (i.e., cabins, picnic shelters, or camping sites) would occur on slopes less than 15 percent and close to existing development. The Master Plan Update recommendations would not involve major new construction in areas of steep slope that could result in high erosion potential.

Implementation of temporary erosion and sediment control Best Management Practices (BMPs) during construction (e.g., mulching bare areas or installing a silt fence) along with permanent BMPs post-construction (e.g., managing the flow of stormwater runoff from impervious areas

such as buildings and parking lots and establishing permanent vegetation buffers) would occur for all proposed activities that would disturb the ground surface. Similar to the situation under the No Action Alternative, for construction activities that would disturb more than one acre, the USACE would secure approval under the National Pollutant Discharge Elimination System by applying for a General Permit for Stormwater Discharges Associated with Construction Activities from the OEPA and would develop construction site erosion control and stormwater management plans as required. To more thoroughly evaluate impacts possibly associated with any recommendation planned for implementation, consideration would be given to soil suitability, slope, and potential for geologic instability during site-specific project planning. Site-specific mitigation measures would be determined prior to construction and implemented as needed.

4.1.4 Land Use/Land Cover

4.1.4.1 No Action

There would be no substantial impacts on land use/land cover under the No Action Alternative. Minor maintenance activities and other USACE actions not associated with the proposed Master Plan Update recommendations would not have noticeable impacts, either individually or cumulatively, on land use and land cover.

4.1.4.2 Proposed Action

None of the recommendations in the Master Plan Update would involve construction of major new facilities that could have substantial effects on land cover or land use. Many of the recommendations would involve some level of land clearing, grading, and other improvements that would change land use and land cover characteristics, but these changes would affect relatively small areas of land and would not have major adverse effects on land use or the land cover characteristics of the Project.

Potential site contamination issues with the existing shooting range may limit its reuse for other purposes if the range is relocated to a new site. The existing range may have to be evaluated to determine the extent and degree of possible contamination from firearms use. The past use of this site may limit the uses to which it could be converted without some form of remediation, depending on the results of a site evaluation. See the additional discussion ahead under Section 4.1.10 Toxic and Hazardous Wastes.

4.1.5 Water Resources and Quality

4.1.5.1 No Action

Under the No Action Alternative, no new proposed facilities or measures recommended in the 2011 Master Plan Update would be implemented. With the anticipated increase in visitation, the USACE would monitor areas that are susceptible to erosion from increased usage and people trying to access new or less congested areas, potentially resulting in the development of social trails, trampling of vegetation on the edges of existing campgrounds, or overuse of existing trails; therefore, the potential for increased sedimentation of the lake would be minimal. The USACE would mitigate any adverse impacts by closing off eroded areas and implementing erosion and sediment controls as needed.

Environmental impacts of operations at USACE facilities and projects are monitored through annual assessments performed as part of the Environmental Review Guide for Operations (ERGO) system. The comprehensive assessments provide an evaluation of compliance with all applicable federal, state, and local environmental laws and regulations by identifying environmental problems and rating these problems as minor, major, or significant, with associated levels of corrective action. Issues related to solid waste handling, erosion control, toxic and hazardous waste handling and management, and other considerations affecting water resources and quality are evaluated. Under the No Action Alternative, the ERGO system would continue to ensure that impacts of Project operations on water resources and quality would be identified early and corrected.

4.1.5.2 Proposed Action

Under the Proposed Action, there would be minimal increases in impervious surface area associated with the recommended actions, so additional stormwater runoff that could potentially affect erosion and increased sedimentation of waterways would be negligible. The risk of water pollution from spilled or water-transported materials would be similarly minimal.

Adverse short-term impacts on surface water quality could occur from sedimentation that is the result of ground disturbances during construction activities, especially in construction areas close to the shoreline or water bodies. Implementing erosion and sediment control BMPs during construction and implementing permanent stormwater runoff controls would minimize potential adverse impacts. For example, disturbed or bare areas remaining after construction would be vegetated to reduce the potential for erosion.

Adverse short- and long-term impacts on water quality may also impact other resources such as recreation (fishing and swimming), water treatment systems, aquatic biological resources, and terrestrial wildlife. Impacts on water quality may occur from trash/debris entering water bodies, sewage, spills, and leaks of contaminants from both land- and water-based vehicles. Mitigation such as setting limits for motorboat carrying capacity, providing adequate trash collection and sewage treatment facilities for the amount of use, and including stormwater runoff measures during the design of redeveloped or new facilities would not only minimize adverse water quality impacts but potentially improve water quality compared to existing conditions. As described above for the No Action Alternative, the USACE ERGO system provides an annual assessment of Project compliance with environmental requirements. Through this system, environmental issues at the Project are identified and corrective actions planned. As a result, ERGO assessments will minimize any potential adverse environmental effects of the Master Plan Update recommendations on water resources and quality. The recommendations in the Master Plan Update for adding new or upgraded sewage facilities at major campgrounds would have positive impacts on both surface water and groundwater quality by providing upgraded treatment of waste.

Localized turbidity in the nearshore lake environment associated with reconstruction of the Southwest Marina, including addition of a courtesy dock and development of an accessible fishing pier in the tailwater area, may create temporary impacts on water quality. Impacts would be limited to the vicinity of the work with implementation of mitigation measures to minimize turbidity. These measures may include utilizing construction techniques that minimize disturbance to submerged vegetation, limiting construction equipment to the banks of the shore to the extent practicable, using a sediment/silt curtain if warranted, and implementing spill prevention and control measures for vehicles operating in or near the water. Other mitigation measures may include limiting the types of wood preservatives that are used. Wood preservatives such as creosote, pentachlorophenols, and chromated-copper-arsenate treated materials may result in pollutants leaching into the water over time.

4.1.6 Floodplains and Flooding

4.1.6.1 No Action

Under the No Action Alternative, new construction not stemming directly from the Master Plan Update could occur within Project areas subject to flooding; however, the USACE would follow existing guidance regarding development within a floodplain. The USACE's publication EM 1110-1-400 (U.S. Army Corps of Engineers, 2004), Sections 2.2.1 and 5.2.2 regarding seasonal

fluctuations, state that seasonal fluctuations in water levels shall be taken into consideration when designing and developing lake and riverside facilities to avoid the placement of facilities in hazardous or high maintenance areas, and that a five-year flood frequency is a good general guideline when planning lakeside development.

4.1.6.2 Proposed Action

Most of the proposed Master Plan Update recommendations would involve minor changes and enhancements of existing Project facilities (e.g. additional campsite construction, expansion of parking, upgrading of potable water supply, and improved wastewater treatment). These proposals would have minimal effects on flooding and flood levels. The USACE would follow existing agency guidance described under the No Action Alternative regarding development within flood-prone areas. The USACE would ensure that its actions comply with USACE's guidance on development within a floodplain (EM 1110-1-400 [U.S. Army Corps of Engineers,2004b]), EO 11988 (Floodplain Management), and USACE's guidance on implementation of EO 11988 (ER 1165-2-26 [U.S. Army Corps of Engineers, 1984]), and would implement BMPs such as secondary containment and/or elevation of hazardous materials above base flood elevations to the maximum extent possible. Additionally, USACE and the State would ensure the safety of visitors by monitoring flood levels at areas and facilities used by the public and taking actions such as closing facilities as necessary. All USACE actions would be in compliance with the provisions of EO 11988.

4.1.7 Air Quality

4.1.7.1 No Action

Under the No Action Alternative, construction of projects not directly associated with the recommendations of the Master Plan Update could result in short-term, highly localized, but still minor impacts on air quality from fugitive dust and construction vehicle emissions. To reduce temporary impacts on air quality from fugitive dust, the construction areas would be watered down when necessary to minimize airborne particulate matter. Emissions from fuel-burning internal combustion engines (e.g. heavy equipment or earthmoving machinery) could temporarily increase the levels of some pollutants, but these increases would be negligible.

4.1.7.2 Proposed Action

Impacts on air quality and mitigation measures to reduce potential impacts would be the same as described under the No Action Alternative. None of the recommendations in the Master Plan

Update would generate any substantial impacts on ambient air quality during or following construction nor generate any violations of State and National Ambient Air Quality Standards.

4.1.8 Climate

4.1.8.1 No Action

The No Action Alternative would have no effects of any kind on existing climate conditions.

4.1.8.2 Proposed Action

Similar to the No Action Alternative, implementation of the Proposed Action would not result in any impacts on climate.

4.1.9 Noise

4.1.9.1 No Action

Construction noise resulting from capital improvements such as campground construction, vegetation management, and other development activities not associated with the 2011 Master Plan Update could generate temporary noise impacts on visitors, employees, and wildlife. In most cases, noise would result in temporary nuisance impacts, potentially affecting the overall recreation experience of Project visitors. To reduce noise impacts, construction activities could be confined to daylight hours during the normal work week and, whenever possible, to the off season or periods of low visitation by recreational users. If deemed appropriate, construction specifications can require contractors to provide muffling of construction equipment. In general, increased use of certain areas, due to improvements, would create additional noise above existing conditions due to the associated increase in human activities. Seasonal noise from boats on the lake could have a negative impact on wildlife, day users, and lakeside campers. However, boating-related noise is a consequence of the recreational purpose of the Project and would be expected to result in only minor impacts on wildlife and visitors.

4.1.9.2 Proposed Action

Impacts from noise and mitigation measures to reduce potential impacts would be the same for the Proposed Action as described under the No Action Alternative. Implementation of the Master Plan Update recommendations may increase use of certain areas of the Project with a commensurate increase in vehicular and motorboat noise; however, as described above, such noise would be experienced by Project users primarily as a temporary and intermittent nuisance,

given the rural nature of the area and the existing low ambient noise level. No major adverse noise impacts would result from implementation of any or all of the Master Plan Update recommendations.

4.1.10 Toxic and Hazardous Wastes

4.1.10.1 No Action

There would be no changes in land use or activities on Project lands that could affect the potential for contamination by toxic and hazardous materials under the No Action Alternative other than the possibility of an accidental spill, particularly of fuel.

4.1.10.2 Proposed Action

If the recommendation for relocating the existing shooting range is implemented, the re-use of the existing range site may be limited due to possible contamination by environmentally-regulated substances (toxic and/or hazardous materials, specifically heavy metals from shot such as lead). The extent of potential contamination at the existing shooting range is not known at present. An evaluation of the existing site by hazardous waste management specialists should be performed to determine if potential contamination exists, the level of any such contamination, and whether site cleanup would be warranted before the site is converted to other uses.

4.2 Biological Environment

4.2.1 Vegetation

4.2.1.1 No Action

Under the No Action Alternative, ODNR and the USACE would continue to monitor, manage, and protect vegetative resources in the Project area on an as-needed basis. Littering and trampling of vegetation could occur from informal use areas, especially with any anticipated increase in visitor usage. The USACE and ODNR would monitor for impacts on vegetation and implement restrictions or restoration as needed while continuing regular maintenance activities for vegetation control.

An area of concern is the introduction and spread of invasive species, which are already evident in parts of the Project. Under the No Action Alternative, there would be no coordinated plan to control invasive species, increasing the possibility over time that such species would adversely impact existing habitat conditions by out-competing native species.

In addition, under the No Action Alternative, the baseline study of significant vegetative resources would not be performed. Without this study, information on the location, size, and condition of resources such as bottomland hardwoods and wetlands would not be obtained, and no active plan would be implemented to monitor conditions of these resources and manage threats that could jeopardize their long-term health and viability within the Project area.

4.2.1.2 Proposed Action

Recommendations in the 2011 Master Plan Update that would have an effect on Project area vegetation include creation and implementation of an invasive species management plan as well as completion of a baseline study to identify sensitive or rare habitats within the Project. These recommendations would generate major positive impacts on vegetation resources in the Project. The invasive species management plan would provide the basis for a concerted effort to control the intrusion and spread of unwanted plant species and limit their impacts on native vegetation throughout the Project. An active invasive species management plan would support the long-term health of the existing ecosystems occurring in the Project, with beneficial long-term effects on numerous Project attributes including scenic quality, wildlife populations, and recreational activities that depend on wildlife.

A baseline study of significant vegetative communities is recommended to locate such sensitive habitats as old growth trees, bottomland hardwoods, wetlands, and any hitherto unknown rare or threatened species. Bottomland hardwood habitats are becoming increasingly scarce and more valuable from an ecological perspective. Because bottomland hardwood habitats support a variety of plant and animal species that can adapt to both flood conditions and dry periods and also support wildlife that does not thrive in other environments, this habitat warrants protection. Management of these areas would yield a high-quality habitat for wildlife that would also be beneficial for many recreational activities, including hunting and wildlife viewing. The study would also include acquiring data on wetlands throughout the Project. Completing a baseline study of these resources would be a first step to providing enhanced protection for rare and valuable habitat and for providing the basis for long-term monitoring of changes in resource conditions to guide proactive management of these resources.

4.2.2 Wetlands

4.2.2.1 No Action

Under the No Action Alternative, the USACE and ODNR would continue to preserve and enhance wetland resources within the Project area as mandated by Executive Order 11990 and the 1985 Master Plan.

4.2.2.2 Proposed Action

At this programmatic stage of the planning process, it does not appear that the proposed Master Plan Update recommendations would adversely impact any wetland areas within the Project based on NWI data. When specific recommendations are ready for implementation, additional site specific surveys for potential jurisdictional wetlands will be undertaken in all areas that could be impacted by the proposed undertaking. One of the recommendations in the 2011 Master Plan Update would involve conducting a baseline survey of significant natural resources, habitats, and communities in the Project, as mentioned above in Section 4.2.1.2. This survey would enhance data on the location, size, and characteristics of wetlands in the Project, providing more reliable data than currently exists. This would support future conservation and management efforts to protect and enhance wetland resources, which would enhance wildlife resources, as well as long-term recreational opportunities for wildlife viewing, nature education, nature photography, and hunting. In addition, another recommendation would involve expanding the area of seasonally-flooded wetlands to increase waterfowl habitat and enhance opportunities for hunting and wildlife observation, providing long-term beneficial impacts on wetland resources in the Project.

The USACE would obtain all appropriate permits as required by Section 401 of the CWA for construction that would impact any waters of the US. The USACE would require other agencies and developers to obtain CWA Section 404 permits prior to implementation of projects that would result in impacts on wetlands.

4.2.3 Terrestrial Wildlife

4.2.3.1 No Action

Under the No Action Alternative, ODNR and the USACE would continue to monitor and manage wildlife in accordance with the 1985 Master Plan and applicable conditions of the

Wildlife Area lease. Wildlife viewing, birding, and opportunities to hunt game in portions of the Project would continue.

4.2.3.2 Proposed Action

The recommended actions proposed in the 2011 Master Plan Update would generate negligible adverse impacts on terrestrial wildlife. There may be some minor amount of terrestrial habitat loss with campground and parking expansion into previously undeveloped areas, but the value of this habitat may be limited due to proximity to frequent human use areas, so impacts are expected to be minor.

4.2.4 Aquatic Life

4.2.4.1 No Action

No adverse impacts on aquatic fauna are expected under this alternative.

4.2.4.2 Proposed Action

Construction activities in the water (e.g., new courtesy docks, docks for a new marina, and a fishing pier) could result in short-term adverse impacts on the aquatic environment. Additionally, excess deposition of sediment as a result of stormwater runoff during land-based construction could adversely affect aquatic life including the food chain, spawning and rearing habitat, in-stream cover, water temperature extremes, and other structural and functional components. Sedimentation from construction in areas adjacent to water bodies would be minimized by implementing erosion and sediment control measures. With the structural and non-structural measures available for erosion and sediment control, impacts on water quality would be minor, short-term, and localized.

Increased recreational use of some areas or facilities within the Project resulting from improvements in these areas or upgraded facilities could also generate additional impacts. For example, higher motorboat traffic on the lake could increase noise disturbances, as well as the potential for spills and/or leaks of pollutants. Higher numbers of recreational users in certain areas of the Project could also increase the volume of trash or sewage entering water bodies and stream bank or lakeside habitat destruction from overuse of some areas that could result in sedimentation or loss of riparian habitat. Effective management of these activities should limit and control the adverse effects resulting from increased usage of specific areas of the Project on aquatic resources.

4.2.5 Threatened, Endangered and Protected Species

4.2.5.1 No Action

Under the No Action Alternatives, USACE actions would continue to be controlled by federal and state endangered species regulations and internal USACE program requirements.

4.2.5.2 Proposed Action

At the time that any of the Resource Plan recommendations are planned for implementation, the USACE will take actions, in compliance with federal and state regulations, to ensure that the recommendations will not adversely affect any threatened and endangered species or any critical habitat that may have been established in or near areas potentially affected by the proposed undertakings. Such actions may include surveys of the potential area of impact to determine whether endangered or threatened species may occur in these areas, either seasonally or throughout the year. If protected species are found, alternatives to the proposed undertakings that would avoid adverse impacts on these species would be evaluated, and management requirements for these species, including ecological requirements and life histories, would be evaluated to identify possible mitigation measures. These actions would be described in supplementary NEPA documentation prepared subsequent to this PEA that would address the impacts of the specific Master Plan Update recommendations and would be made available for public and jurisdictional agency review and comment prior to implementation.

4.3 Socioeconomic Environment

4.3.1 Population and Employment

4.3.1.1 No Action

The No Action Alternative is not anticipated to generate any consequential impacts, either positive or negative, on local or regional population, employment, or income.

4.3.1.2 Proposed Action

The Proposed Action is not expected to have any effect on population. Construction of some of the recommendations could produce short-term economic benefits from temporary construction employment; however, these effects are not expected to be substantial.

4.3.2 Environmental Justice

4.3.2.1 No Action

Existing programs and operation and maintenance activities that would continue under the No Action Alternative, as well as new facilities and/or activities not identified in the 1985 Master Plan Update that may be constructed or implemented on a case-by-case basis, would likely generate no disproportionate impacts on environmental justice populations. The majority of these actions would be implemented within the boundaries of the Project and at a distance from local population centers. As a result, any environmental justice populations that may occur in the Project vicinity would not be directly impacted by these actions, and indirect impacts would be inconsequential.

4.3.2.2 Proposed Action

As discussed previously in Section 3.2.2, the use of 2000 Census data to determine the possible presence of minority and/or low income populations in areas that may be affected by the proposed Master Plan Update recommendations is questionable given the high growth rate and other population changes that have occurred in the Project vicinity during the past decade, particularly in Delaware County. More specific evaluations of potential environmental justice impacts that will be required as part of any future supplementary project-specific NEPA documentation should be based on the more accurate data from the 2010 Census. At the time that specific actions are planned for implementation and it is determined that additional NEPA documentation will be needed for these actions, 2010 Census block data should be available for use in determining whether potential minority and low income populations may exist in areas that could be impacted by the proposed actions. These data can be used to determine if the proposed actions are likely to generate adverse impacts on these populations and whether these impacts are disproportionate.

The locations within the Project where Resource Plan recommendations would be implemented are generally far removed from populated areas. As a result, local residents would be unlikely to experience direct impacts from implementing these recommendations, whether disproportionate or otherwise. However, if these recommendations result in increased visitation to the Project, local residents may be indirectly impacted, negatively by increased traffic and positively by increased revenue, from the greater number of Project recreational users who may buy supplies or accommodations locally. The direct and indirect impacts resulting from the proposed Resource Plan recommendations on local communities are not expected to be substantial, and it

is unlikely that such impacts could likely be considered as disproportionate if environmental justice populations were determined to exist in any affected community. Final determination will be made when the impacts of individual recommendations planned for implementation are analyzed as part of any supplementary NEPA evaluations that may be required for these actions.

4.3.3 Transportation and Traffic

4.3.3.1 No Action

Certain areas of the Project are currently experiencing some congestion, especially during peak recreational periods and during holidays. As visitor use increases, the ability of the existing facilities to handle the increase in traffic would decline resulting in increased traffic congestion.

4.3.3.2 Proposed Action

Increased traffic from construction and worker vehicles during construction could result in minor temporary impacts on traffic and transportation, but in most areas, the impact would likely be negligible. The expansion of parking areas as proposed at the Dam Site Recreation Area would have long-term beneficial impacts on vehicular traffic, and the improvements to the boat ramps and associated parking would have long-term beneficial impacts on traffic flow, likely reducing congestion in these areas.

4.3.4 Recreation

4.3.4.1 No Action

The provision of recreational facilities and services would continue under the No Action Alternative, but the 1985 Master Plan would not accurately reflect the current status of Project facilities. New improvements to recreational and support facilities could be developed on a project-by-project basis, but these improvements would represent a piecemeal and potentially inefficient approach to fulfilling the authorized purposes of the Project in the long term.

4.3.4.2 Proposed Action

Recreational needs of the public would be better accommodated through implementation of a comprehensive plan over the long term as represented by the 2011 Master Plan Update. The Proposed Action is based on a review of the existing facilities, resource suitability, trends and forecasts of future demand, and discussions with stakeholders. There would be beneficial impacts on recreation not only from modernizing and upgrading existing facilities (e.g.

expanding facilities for fishing and boating in addition to upgrading existing infrastructure), but also from increasing the management of natural resources through some of the Resource Plan recommendations. Such recommendations include baseline studies of significant natural resources and development of invasive species control plans, both of which could improve the health of local habitats and encourage wildlife diversity. Expanding the camping experience with modern, upgraded facilities would also complement the existing campsites presently available.

4.3.5 Historic and Prehistoric Resources

4.3.5.1 No Action

Under this alternative, actions by the USACE that are not associated with the 2011 Master Plan Update recommendations would be guided by the 2004 HPMP as well as the other historic/archaeological resource investigations previously discussed in Section 3.3.5. Considerable information is thus available to minimize adverse impacts on cultural resources of any USACE activities. The District Archaeologist would determine the need to avoid, minimize, or mitigate impacts on cultural resources in keeping with the determinations of NRHP eligibility or the need for further investigation. The District Archaeologist would also determine the need for cultural resource surveys for any unsurveyed areas of the Project where actions are proposed and recommend appropriate courses of action. Activities that may affect cultural resources would be coordinated with the Ohio Historic Preservation Officer under the requirements of the Advisory Council on Historic Preservation.

4.3.5.2 Proposed Action

Most of the cultural resources discovered during previous surveys of the Project have been evaluated regarding eligibility for nomination to the NRHP, although a few have not. In addition, some areas of the Project remain unsurveyed for cultural resources. At the time that specific Master Plan Update recommendations are ready for implementation, actions in areas not previously surveyed will require coordination with the District Archaeologist to determine if a cultural resource survey is required, whether or not it is prepared as part of subsequent NEPA documentation. Cultural resource research, evaluation, and reporting must comply with all applicable federal and state laws and regulations.

4.3.6 Aesthetics

4.3.6.1 No Action

Under the No Action Alternative, aesthetics in the Project area would remain essentially unaffected. Panoramic views of the lake and surrounding terrain would remain available to visitors from the dam site, in the tailwater area, and along the lake, particularly in the northern portion of the Project.

4.3.6.2 Proposed Action

Implementation of the Proposed Action would have no substantial effects on aesthetic conditions within the Project.

4.4 Cumulative Impacts

4.4.1 Past and Present Actions

Cumulative impacts would result from the incremental impact of the Proposed Action added to impacts from other past, present, or reasonably foreseeable future actions in the local area. Geographical boundaries for this discussion of cumulative impacts are the Project area and Delaware, Marion, and Morrow Counties. Temporal boundaries are the reservoir impoundment operational date (1951) to 75 years into the future (2026).

4.4.2 Reasonably Foreseeable Future Actions

Master Plan Update for Alum Creek Lake Project

Concurrent with preparation of the Master Plan Update for the Delaware Lake Project, a Master Plan Update is being prepared for the nearby Alum Creek Lake Project. The resource plan for this Master Plan Update includes a list of recommendations for upgrading, evaluating, and protecting Project resources and enhancing the authorized purposes of Alum Creek Lake. The recommended structural improvements include: building pedestrian and bike paths to link various Project facilities and provide connections to the surrounding communities; working with Delaware County to add bike lanes to Lewis Center Road and Africa Road; developing additional RV campsites and building additional cabins; reconfiguring boat ramps and adding courtesy docks; upgrading existing docks to accommodate larger watercraft; reconstructing the existing breakwater to protect the marina; implementing an invasive species control plan; and a

number of smaller improvements such as upgrading picnic facilities, restrooms, and group shelters, and expanding and/or reconfiguring parking and boat launch areas.

Major Utility Corridors

The 2011 Master Plan Update discusses the possibility of establishing major utility corridors through the Project to accommodate future development of linear infrastructure such as gas and oil pipelines and electrical transmission and distribution lines. Criteria were presented for establishing potential utility corridors that would minimize adverse impacts by avoiding sensitive Project resources such as wetlands and known historic and archaeological sites as well as popular and heavily utilized recreational areas. However, there are no specific plans or proposals for such developments across Project lands. The discussion in the Master Plan Update is intended to address planning-level considerations to anticipate possible future actions in regard to establishing corridors of this type. At this time, there are no reasonably foreseeable projects of this type that are planned for the time period of this cumulative impacts analysis, and, consequently, the establishment of utility corridors across Project lands was not considered in this analysis.

General Development Pressures

The greatest driver of impacts on environmental resources in the geographical area of interest is residential and commercial development. As discussed in Section 4 of the Master Plan Update, there is expected to be a 60 percent increase in population in the primary area of influence between 2000 and 2020 and a 16 percent increase in the secondary area of influence over the same time period. During the past decade, Delaware County has seen tremendous growth, primarily as an offshoot of the growth of the greater Columbus metropolitan area. The growth rates in Marion and Morrow Counties have been much smaller, in large part due to their increased distance from Columbus. The rapid growth of Delaware County has resulted in conversion of agricultural lands and woodlands into residential and commercial developments, with associated impacts on a range of environmental amenities including loss of wetlands and terrestrial habitat for wildlife, increased traffic congestion, reduction in air quality, and higher ambient noise levels. These development trends are expected to continue into the foreseeable future and will be the principal driver of adverse impacts on the environmental attributes of the area of concern.

For purposes of this PEA, the impacts of regional residential and commercial development were not quantified. However, if cumulative impacts are deemed to be a significant consideration in

the preparation of any supplementary NEPA documentation for specific Master Plan Update actions, these trends will have to be investigated in greater detail to attempt to identify the magnitude and extent of adverse impacts on environmental factors.

4.4.3 Effects

The recommendations in the resource plans for both Delaware Lake and Alum Creek Lake Projects could, cumulatively, generate some minimal adverse effects on terrestrial and aquatic habitat, but it is anticipated that these cumulative impacts, individually and in combination, would be inconsequential when compared to the likely impacts stemming from the continuing conversion of undeveloped lands into new residences and businesses, particularly in the primary area of influence. This conversion has adversely impacted, and will likely continue to adversely impact, wetland resources, terrestrial and aquatic habitat and wildlife, air quality conditions, ambient noise levels, and traffic conditions on the regional transportation network. The potential adverse cumulative impacts of the 2011 Master Plan Update Resource Plan recommendations for the Delaware Lake Project on these environmental resources and considerations, evaluated in combination with the expected impacts of increased development throughout the area of interest, would not be substantially different than the impacts of the development activities considered separately.

As the area around both Delaware Lake and Alum Creek Lake experiences increased development in the future, terrestrial resources surrounding the reservoir will become increasingly limited. With the loss of vegetated land area outside Project boundaries, wildlife is likely to be concentrated in the remaining forested lands. In addition, more pressure will be placed on the public lands for the facilities and activities that are provided. Because visitation to the Alum Creek Lake and Delaware Lake Projects is expected to increase, demands for recreational facilities will also continue to increase. Facilities will need continual repair and upgrade to meet visitor expectations. In addition, there may be conflicting demands for recreational opportunities on the lakes and Project lands. Although the continued request for uses of Project lands by various interests will also add more demands on the limited Project lands and waters, the USACE would not allow development to exceed the carrying capacity of the Project's environmental resources; development would be limited to a sustainable level. Implementation of the Proposed Action (implementation of the Master Plan Update) would provide a tool for the resource staff of Delaware Lake to ensure that natural resources and Project facilities are being used to the greatest extent possible without degrading resources. The same situation will exist at the Alum Creek Lake Project. Designating areas for existing and future outgrants of Project

lands would limit the extent and severity of potential impacts at each Project and the cumulative impacts of Plan implementation at both Projects.

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5.0 SUMMARY OF MITIGATION MEASURES AND AGENCY CONSULTATION REQUIREMENTS

The following measures would be implemented, as appropriate, to avoid or minimize adverse impacts on resources:

- Instituting erosion and sediment control BMPs for all projects involving ground disturbance and obtaining an National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction Activities from the OEPA for any project that would disturb greater than one acre of ground;
- Obtaining Section 401 Water Quality Certification from the OEPA for work in waters of the U.S. including the near shore environment of the lake;
- Avoiding lakeside development in hazardous or high maintenance areas and areas subject to the 5-year flood frequency when planning lakeside development;
- Surveying for the presence of federally listed species under Section 7 of the Endangered Species Act where potential habitat may occur or as directed by the USFWS prior to construction; and
- Surveying for the presence of cultural resources as needed prior to construction.

In addition to the measures stated above, the USACE would consult with the following agencies prior to implementation of Resource Plan recommendations:

- USFWS under Section 7 of the Endangered Species Act; and
- Ohio Historic Preservation Office (Ohio Historical Society) under Section 106 of the National Historic Preservation Act as well as other consulting parties, including Native American Tribes, as appropriate.

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6.0 PUBLIC INVOLVEMENT

A public meeting and two stakeholder meetings were held on 13 August 2009 during the scoping phase of updating the Master Plan. The scoping process is used to invite public participation, identify issues, and obtain public comment in the Master Plan formulation process. The public meeting, conducted at the USDA Forest Service Northeastern Research Station (359 Main Road, Delaware, OH), contributed to understanding of key project issues and needs as well as formulating the resource objectives presented in the Master Plan Update. Two stakeholder meetings were also held on 13 August 2009 at the USDA Forest Service Northeastern Research Station. The results of the three meetings are summarized in Chapter 2.0 of the Master Plan Update and a detailed summary of comments provided by the public and stakeholders is presented in Appendix C of the Master Plan Update.

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7.0 REFERENCES

ASC Group, Inc. 2011. *Archaeological Survey of Shoreline, Dam Areas, and Recreation Areas for the US Army Corps of Engineers, Huntington District Lakes in Kentucky, Ohio, Virginia, and West Virginia (Draft)*. Contract W912P9-09-D-0536. Prepared for the Huntington District, U.S. Army Corps of Engineers, Charleston, West Virginia.

Cultural Resource Analysts, Inc. 2004. *Historic Properties Management Plan for Delaware Lake, Delaware, Marion, and Morrow Counties, Ohio*. Contract DACW69-03-D-0005. Prepared for the Huntington District, U.S. Army Corps of Engineers, Charleston, West Virginia.

Friends of Alum Creek and Tributaries. February 2005. *Lower Alum Creek Watershed Action Plan.* Columbus, Ohio.

National Climatic Data Center, Midwest Regional Climate Center. 2011. http://mrcc.isws.illinois.edu/.

NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA, U.S.A. Data current as of 06 October 2007.

Ohio Department of Development, Office of Strategic Research. July 2003. *Population Projections by Age and Sex: 2005 – 2030.*

Ohio Department of Development, Office of Policy Research and Strategic Planning. 2011. *Ohio County Profiles.* Columbus, Ohio.

Ohio Department of Natural Resources, Division of Water, Water Resources Section. 2005a. *Ground Water Pollution Potential of Delaware County, Ohio*. Columbus, Ohio.

Ohio Department of Natural Resources, Division of Wildlife. 2005b. *Ohio Comprehensive Wildlife Conservation Strategy.* Columbus, Ohio.

Ohio Department of Natural Resources, Division of Wildlife. 2011a. List of Species at Delaware Management Area. http://www.dnr.state.oh.us/Home/ExperienceWildlifeSubHomePage.aspx

Ohio Department of Natural Resources, Division of Wildlife. 2011b. Fishing Information. http://www.dnr.stat.oh.us/tabid/19510/Default.aspx.

Ohio Department of Natural Resources, Division of Natural Areas and Preserves. 2011. http://www.dnr.state.oh.us/Default.aspx?alias=www.dnr.state.oh.us/dnap.

Ohio Department of Transportation. 2010. *Phase I Cultural Resources Survey and Deep Testing for the Proposed CR 146 Bridge Replacement over Whetstone Creek in Westfield Township, Morrow County, Ohio.* MRW-CR 146-0.28, PID 77240. Columbus, Ohio.

U.S. Army Corps of Engineers. March 30, 1984. Water Resources Policies and Authorities - Implementation of Executive Order 11988 on Flood Plain Management. Publication Number ER 1165-2-26. http://140.194.76.129/publications/eng-regs/er1165-2-26/toc.htm. Washington, D.C.

U.S. Army Corps of Engineers. September, 1985. Master Plan Update – Design Memorandum 1-A, Delaware Lake, Ohio.

U.S. Army Corps of Engineers. 1996a. Engineering Regulation (ER) 1130-2-550, Recreation Operations and Maintenance Policies. Chapter 3: Project Master Plans and Operational Management Plans. Washington, DC.

U.S. Army Corps of Engineers. 2004a. *Delaware Lake Water Control Manual.* Huntington District, Charleston, West Virginia.

U.S. Army Corps of Engineers. November 2004b. Engineering Manual (EM) 1110-1-400, *Engineering and Design – Recreation Facility and Customer Services Standards*. Washington, DC.

U.S. Census Bureau. 2011. *American Fact Finder.* http://factfinder2.census.gov/main.html.

U.S. Department of Agriculture, Natural Resources Conservation Service. 1989. *Soil Survey of Marion County, Ohio.* Columbus, Ohio.

U.S. Department of Agriculture, Natural Resources Conservation Service. 1993. *Soil Survey of Morrow County, Ohio.* Columbus, Ohio.

U.S. Department of Agriculture, Natural Resources Conservation Service. 2006. *Soil Survey of Delaware County, Ohio.* Columbus, Ohio.

U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. 2011. Green Book. http://www.epa.gov/oar/oaqps/greenbk/. Washington, D.C.

U.S. Fish and Wildlife Service. December 1979. *Classification of Wetlands and Deepwater Habitats of the United States.* Biological Services Program Publication FWS/OBS-79/31. Washington, D.C.

U.S. Fish and Wildlife Service, November 2010. *Federally-Listed Species by Ohio County.* Columbus, Ohio.

Appendix A:
Delaware Lake Master Plan Update

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See *Delaware Lake Master Plan Update August 2011*

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Appendix B:
Project Correspondence
And
Agency Coordination

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URS

July 1, 2010

U.S. Fish and Wildlife Service
Ohio Ecological Services Field Office
Attn: Dr. Mary Knapp, Field Supervisor
4625 Morse Road, Suite 104
Columbus, OH 43230

RE: Notification of Preparation of Programmatic Environmental Assessments and Request for Initial Project Review
Master Plan Updates for Delaware Lake and Alum Creek Lake
U.S. Army Corps of Engineers, Huntington District

Dear Dr. Knapp:

The U.S. Army Corps of Engineers (USACE) Huntington District has retained URS Corporation to update the Master Plans for Delaware Lake and Alum Creek Lake near Delaware, Ohio. As part of the Master Plan Updates, programmatic Environmental Assessments (EAs) will be prepared to evaluate the potential environmental impacts from the proposed actions. A separate Master Plan Update and programmatic EA are being developed for each site. The EAs are being prepared to satisfy USACE's obligations under the National Environmental Policy Act of 1969 and will also serve as a means for ensuring compliance with a variety of other Federal statues, including, but not limited to, the Endangered Species Act, National Historic Preservation Act, Fish and Wildlife Coordination Act, and the Clean Water Act. The last Master Plan Update for Delaware Lake was prepared in 1985; for Alum Creek Lake, the last Master Plan Update was prepared in 1984.

The Master Plan Update study objectives for both Delaware Lake and Alum Creek Lake include formulation of programs and measures to accomplish the following:

- Enhance the recreational experience of park visitors;
- Minimize impacts of recreational use on project resources;
- Enhance and conserve wildlife habitat and promote conservation education;
- Identify significant and/or environmentally sensitive resources for preservation;
- Delineate and map culturally and historically important site resources;
- Develop natural resource inventories;
- Identify acceptable easement alignments through USACE property;
- Evaluate potential impacts of invasive species on project resources;
- Evaluate suitability of project lands for recreational hunting and trapping;
- Evaluate the potential for a winter recreation area;
- Evaluate the potential for improving traffic circulation and connections between the project site and surrounding communities;
- Evaluate the adequacy of onsite circulation routes, parking, and accessibility to support current and proposed recreational activities and facilities;

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- Analyze opportunities for improving water-based recreation and access; and
- Develop a regional approach to evaluating recreation and resource based objectives for the Delaware Lake and Alum Creek Lake project areas.

To accomplish these objectives, the Master Plan Updates will provide recommendations for modifying existing facilities and/or developing new facilities to best meet current and future requirements given project constraints. The need for possible changes in management plans for wildlife resources and habitat will also be examined. Based on conceptual layouts, potential land re-classifications required for future implementation will be identified. Maps depicting the Delaware Lake and Alum Creek Lake project areas and surrounding environs are enclosed for reference purposes.

The USACE plans to make the Draft EA available for public review in September 2010. You will be notified of the availability of the Draft EA and your comments on the EA will be requested at that time. In the interim, we request that your agency provide a list of endangered and/or threatened species and critical habitats under Federal jurisdiction that have been identified within the Delaware Lake and Alum Creek Lake project areas. We would also appreciate your identification of other significant fish, wildlife, and plant resources in areas that may be affected by these projects, any preliminary resource concerns, as well as potential issues that should be taken into account during development of the Master Plan Updates and EAs.

Thank you for your assistance in this regard. If you have any questions or require additional information, please contact me at your earliest convenience at allen_muhic@urscorp.com.

Sincerely,

Allen R Muhic

Allen R. Muhic, CEP
Senior Environmental Planner

Enclosures

Cc: Dan Bock, USACE, Huntington District
Tom Hunter, URS Corporation

URS

August 6, 2010

Mr. Chris Korleski, Director
Ohio Environmental Protection Agency
P.O. Box 1049
Columbus, OH 43216

RE: Notification of Preparation of Environmental Assessment and Request for Initial Project Review
Master Plan Updates for Alum Creek Lake and Delaware Lake
U.S. Army Corps of Engineers, Huntington District

Dear Mr. Korleski:

The U.S. Army Corps of Engineers (USACE) Huntington District has retained URS Corporation to update the Master Plans for Alum Creek Lake and Delaware Lake near Delaware, Ohio. As part of the Master Plan Updates, programmatic Environmental Assessments (EAs) will be prepared to evaluate the potential environmental impacts from the proposed actions. The EAs are being prepared to satisfy USACE's obligations under the National Environmental Policy Act of 1969 and will also serve as a means for ensuring compliance with a variety of other Federal statutes, including, but not limited to, the Endangered Species Act, the National Historic Preservation Act, the Fish and Wildlife Coordination Act, and the Clean Water Act. The last Master Plan Update for Alum Creek Lake was prepared in 1970, while the last Master Plan Update for Delaware Lake was prepared in 1985. Maps depicting the Alum Creek Lake and Delaware Lake project areas and surrounding environs are enclosed for reference purposes.

The study objectives for the Alum Creek Lake Master Plan Update and the Delaware Lake Master Plan Update include formulation of programs and measures to accomplish the following:

- Enhance the recreational experience of park visitors;
- Minimize impacts of recreational use on project resources;
- Enhance and conserve wildlife habitat and promote conservation education;
- Identify significant and/or environmentally sensitive resources for preservation;
- Delineate and map culturally and historically important site resources;
- Develop natural resource inventories;
- Identify acceptable easement alignments through USACE property;
- Evaluate potential impacts of invasive species on project resources;
- Evaluate suitability of project lands for recreational hunting and trapping;
- Evaluate the potential for a winter recreational area;

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- Evaluate the potential for improving connections between the project area and surrounding communities;
- Evaluate the adequacy of on-site circulation, parking, and accessibility to support current and proposed recreational activities/facilities;
- Evaluate opportunities for improving water-based recreation and access; and
- Develop a regional approach for evaluating recreation and resource-based objectives for the Alum Creek Lake and Delaware Lake project areas.

To accomplish these objectives, the Master Plan Updates will provide recommendations for modifying existing facilities and/or developing new facilities to best meet current and future requirements given project constraints. Based on conceptual layouts, potential land re-classifications required for future implementation will be identified. The need for possible changes in management plans for wildlife resources and habitat will also be examined.

The USACE plans to make the Draft EAs available for public review within the next two to three months. You will be notified of the availability of the Draft EAs and your comments on the EAs will be requested at that time. In the interim, we would like to request the views of your agency and any preliminary comments on the proposed projects, including potential issues that should be taken into account during development of the Master Plan Updates and EAs.

Thank you for your assistance in this regard. If you have any questions or require additional information, please contact me at your earliest convenience at allen_mubic@urscorp.com.

Sincerely,

Allen R. Mubic, CEP
Senior Environmental Planner

Enclosure

cc: Dan Bock, USACE, Huntington District
Tom Hunter, URS Corporation

URS

August 6, 2010

Ohio Department of Natural Resources
Building D3
2045 Morse Rd.
Columbus, OH 43229

RE: Notification of Preparation of Environmental Assessment and Request for Initial Project Review
Master Plan Updates for Alum Creek Lake and Delaware Lake
U.S. Army Corps of Engineers, Huntington District

To Whom It May Concern:

The U.S. Army Corps of Engineers (USACE) Huntington District has retained URS Corporation to update the Master Plans for Alum Creek Lake and Delaware Lake near Delaware, Ohio. As part of the Master Plan Updates, programmatic Environmental Assessments (EAs) will be prepared to evaluate the potential environmental impacts from the proposed actions. The EAs are being prepared to satisfy USACE's obligations under the National Environmental Policy Act of 1969 and will also serve as a means for ensuring compliance with a variety of other Federal statutes, including, but not limited to, the Endangered Species Act, the National Historic Preservation Act, the Fish and Wildlife Coordination Act, and the Clean Water Act. The last Master Plan Update for Alum Creek Lake was prepared in 1970, while the last Master Plan Update for Delaware Lake was prepared in 1985. Maps depicting the Alum Creek Lake and Delaware Lake project areas and surrounding environs are enclosed for reference purposes.

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- Evaluate suitability of project lands for recreational hunting and trapping;
- Evaluate the potential for a winter recreational area,

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- Evaluate the potential for improving connections between the project area and surrounding communities;
- Evaluate the adequacy of on-site circulation, parking, and accessibility to support current and proposed recreational activities/facilities;
- Evaluate opportunities for improving water-based recreation and access; and
- Develop a regional approach for evaluating recreation and resource-based objectives for the Alum Creek Lake and Delaware Lake project areas.

To accomplish these objectives, the Master Plan Updates will provide recommendations for modifying existing facilities and/or developing new facilities to best meet current and future requirements given project constraints. Based on conceptual layouts, potential land re-classifications required for future implementation will be identified. The need for possible changes in management plans for wildlife resources and habitat will also be examined.

The USACE plans to make the Draft EAs available for public review within the next two to three months. You will be notified of the availability of the Draft EAs and your comments on the EAs will be requested at that time. In the interim, we would like to request the views of your agency and any preliminary comments on the proposed projects, including potential issues that should be taken into account during development of the Master Plan Updates and EAs.

Thank you for your assistance in this regard. If you have any questions or require additional information, please contact me at your earliest convenience at allen.muhic@urscorp.com.

Sincerely,

Allen R. Muhic, CEP
Senior Environmental Planner

Enclosure

cc: Dan Bock, USACE, Huntington District
Tom Hunter, URS Corporation

Appendix C:
Document Distribution
and
Notification of Availability of Draft Delaware Lake Programmatic Environmental Assessment

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Project:	**Notice of Availability of Draft PEA and MPU Legal Advertised in following Newspapers :**	
Alum and Delaware Combined	Regional market – August 30, 2011 *Columbus Dispatch*	Local market – August 31, September 7,14,21, 2011 *Delaware Gazette*
Project:	**Documents distributed for comment to:**	
Alum Creek Lake	USACE Alum Creek Lake Project Office Bob Wattenschaidt 5905 Lewis Center Road Lewis Center, OH 43035-9215 740-548-6151	The Columbus Metropolitan Library 96 S. Grant Ave. Columbus, OH 43215 (614) 645-2275
Delaware Lake	USACE Delaware Lake Project Office Ben Odell 5202 US 23 North Delaware, OH 43015 740-336-4011	Delaware County Library 84 East Winter Street Delaware, OH 43015-1959 (740) 362-3861
Project:	**Notification of Availability letter to be sent to:**	
Alum and Delaware Combined	Ohio Department of Natural Resources Building D3 2045 Morse Road Columbus, OH 43229	Ohio Department of Natural Resources Victor Ricks 3615 South Old State Road Delaware, OH 43015 740-548-4631
	Ohio Environmental Protection Agency Mr. Chris Korleski, Director P. O. Box 1049 Columbus, OH	U. S. Fish and Wildlife Service Ohio Ecological Services Field Office Dr. Mary Knapp, Field Supervisor 4625 Morse Road, Suite 104 Columbus, OH 43230
	Delaware County Regional Planning Commission Scott B. Sanders, Executive Director 109 North Sandusky Delaware, OH 43015	Delaware County Engineer Brett R. Bergefurd 50 Channing Street Delaware, OH 43015

Text of the legal advertisement:

Notice of Availability

The U.S. Army Corps of Engineers, Huntington District, has prepared **Master Plan Updates** and **Draft Programmatic Environmental Assessments** for **Alum Creek Lake** and **Delaware Lake Projects.**

Master Plans are used by the Corps to address issues such as outgrants, public use, and appropriate use of Project lands. The Master Plan Updates include recommendations for improvements to support the authorized Project purposes. Programmatic Environmental Assessments provide a broad evaluation of potential environmental consequences of proposed Project improvements.

The documents will be available August 31, 2011 for public review at:

- USACE Project Offices at Alum Creek Lake and Delaware Lake,
- The Columbus Metropolitan Library,
- The Delaware County Library,
- Website: http://www.lrh.usace.army.mil/projects/review/.

Comments pertaining to the documents will be accepted until September 30, 2011.
Comments may be submitted on the website above,
by e-mail to: LRHPublicComments@usace.army.mil;
or by letter to: Mr. Jonathan J. Aya-ay, Chief Environmental Analysis Section,
Planning Branch Huntington District Corps of Engineers
502 Eighth Street
Huntington, West Virginia 25701-2070